

# Law of Physics 20<sup>th</sup>-Century Scientists Overlooked (Part 6)

## Cosmic-Scale Conservation of Energy

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**Abstract:** The explanation of energy conservation on the cosmic scale requires an understanding of two sets of processes. (1) The set of processes by which electromagnetic energy, the energy of photons in the free state or in the confined state, is gained or is diminished. (2) The set of processes by which the vacuum, i.e., aether, is generated or is lost —processes by which it emerges/expands and by which it suffers contraction and vanishment. At the heart of the explanation is a straightforward definition of energy at the fundamental level: Any process in which there is a quantitative change in the units of aether (the discretized medium that permeates all space) constitutes, in and of itself, a manifestation of energy. The workings of the long-overlooked mechanism are revealed. Cosmic-scale energy conservation is maintained by balancing the relevant processes of two distinct realms —the physical and the sub-physical. The physical realm achieves balance by means of a harmony between processes of photon energy gain and energy loss. The sub-physical realm achieves balance through the harmony between aether emergence and aether consumption/vanishment. Needless to say, the implications for cosmology are profound.

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**Résumé:** L'explication de la conservation de l'énergie à l'échelle cosmique nécessite une compréhension de deux ensembles de processus. (1) L'ensemble des processus par lesquels l'énergie électromagnétique, l'énergie des photons à l'état libre ou à l'état confiné, est acquise ou diminuée. (2) L'ensemble des processus par lesquels le vide, c'est-à-dire l'éther, est généré ou est perdu - processus par lesquels il émerge/se dilate et par lesquels il subit une contraction et une disparition. Au coeur de l'explication se trouve une définition simple de l'énergie au niveau fondamental: Tout processus dans lequel il y a un changement quantitatif dans les unités d'éther (le milieu discrétisé qui imprègne tout l'espace) constitue, en soi, une manifestation d'énergie. Le fonctionnement du mécanisme longtemps négligé est révélé. La conservation de l'énergie à l'échelle cosmique est maintenue en équilibrant les processus pertinents de deux domaines distincts - le domaine physique et le domaine sous-physique. Le domaine physique atteint l'équilibre au moyen d'une harmonie entre les processus de gain et de perte d'énergie des photons. Le royaume sous-physique atteint l'équilibre grâce à l'harmonie entre l'émergence de l'éther et la consommation/disparition de l'éther. Inutile de dire que les implications pour la cosmologie sont profondes.

**Keywords:** Energy Conservation; Positive and Negative Fundamental Processes; Positive and Negative Fundamental Energy; Mass Extinction; Aether Deprivation; Aether Medium; End-State Neutron Star; Terminal Neutron Star; Blueshift Process; DSSU Theory.

# Law of Physics 20th-Century Scientists Overlooked (Part 6): Cosmic-Scale Conservation of Energy

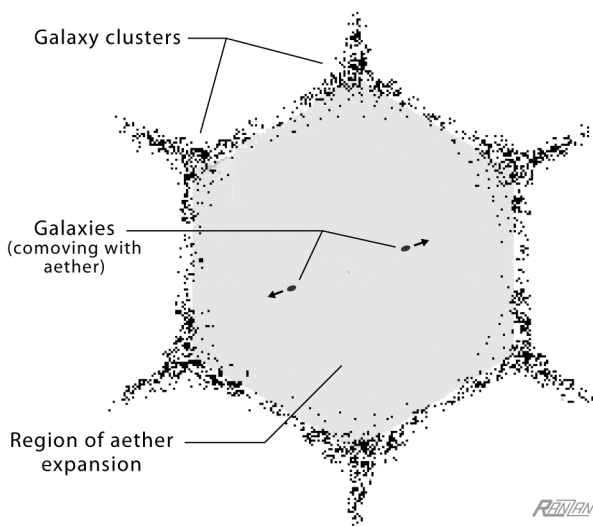
Conrad Ranzan

## 1. Two Questions

There is something peculiar about kinetic energy. It can be shown that this energy may be acquired without any interaction, without any transfer of energy. Such a situation arises in certain regions of the universe.

Consider a typical cosmic void, about  $300 \times 10^6$  lightyears across, surrounded by the usual web of galaxy clusters. The space medium of the void is expanding—expanding because this is its intrinsic nature. The *vacuum*, the quantum foam, or the aether—uninfluenced within the void by mass and mass-produced contractile fields—expands. This property of “expansion” is a foundational property of all modern cosmology.

Within this void, we drop two test objects, say, a pair of galaxies. See **Figure 1**. Placed sufficiently far apart and with the center point of expansion located between them, the test galaxies will drift apart as they comove with the flowing aether medium. Moreover, as they move apart, they will do so with an accelerating speed. Remarkably, without any physical interaction, the galaxies are ‘pushed’ apart. Without any transfer of energy, the galaxies gain enormous kinetic energy. Each galaxy acquires significant energy of motion—significant when referenced to the distant galaxy clusters and particularly when referenced to the cluster into which each will eventually merge. [1]



**Figure 1.** Mass acquires kinetic energy within a typical cosmic Void, but without any transfer of energy taking place. Voids, like the one shown here in cross-section and highly schematic, are typically 300+ million lightyears across and surrounded by a web of galaxy clusters. The aether in the Void continuously expands, but the Void itself does NOT. This is because the galaxy clusters compensatingly contract aether.

The question is *Where did the energy come from?*

Here is the problem: Without a fundamental definition of energy, there is really no way to explain the source of the energy and the veritable cause of the motion. Moreover, there is a deeper aspect to the question; there is the issue of energy conservation that must be addressed.

Turning to another situation, one that is even more remarkable. When exceedingly massive stars collapse to the Terminal state (something called an *end-state neutron star*); or when a sufficient quantity of degenerate mass accretes; or when previously collapsed stars collide; then a significant loss of mass will occur. Nature, as is now known, has a way of *totally* annihilating mass without requiring any energy and without any surviving energy whatsoever. It is a mechanism of the total vanishment of mass. [2]

The question now is *Where did the mass energy vanish to?*

For an explanation, once again, a truly fundamental definition of energy is needed.

Two scenarios, two questions. *Where did the energy come from?* and *Where did the energy go?* The challenge is to provide not only explanations for the simple example of kinetic energy acquisition and the strange disappearance of mass energy but also to make them fit into a functional conservation-of-energy framework.

For these and other energy-related questions that arise in 21<sup>st</sup>-century cosmology, what is needed is a deep understanding of the connection between energy and aether. Understanding begins with a basic definition.

## 2. Energy Defined at the Most Fundamental Level

The 20<sup>th</sup>-century concept of energy was not well understood, and certainly not at a deep level. The following description, taken from a contemporary textbook *Foundations of Space Science*, summarizes the situation.

“Energy is a very useful concept that appears in one way or another in almost every significant theory. But *it is impossible to say exactly what ‘energy’ is*. It is recognized by the action or changes it produces. Every definition of energy ends up saying that it is what causes something to happen. An object at rest does not move unless energy is spent to accomplish the motion. Energy is the cause of the motion but there is no answer to the question of *what causes energy*.”[Ref. 3, emphasis added]

There is another problem: the lack of a unifying framework.

“The concept of energy is used in the same way [as Newton’s Law of Gravitation] except that it appears in so many forms that *no single theory or law can describe how it operates.*”[Ref. 3, emphasis added]

The experts of the time were baffled by energy in terms of what it is, what causes it, and how it operates. However, in the early part of the 21<sup>st</sup> century, the fundamental mechanism of energy was discovered —recognized and refined in conjunction with the development of DSSU<sup>A</sup> cosmology, in which it is a key element.

**Foundational definition of energy:** Any quantitative change in the space medium, herein called aether (“aether”, in turn, defined as a non-material non-energy essence), manifests as one or another form of energy. If there is no quantitative change in aether, then there is no manifestation of energy. *Fundamental energy* consists of essentially two processes: One is the emergence of discrete aether units/entities; the other is their vanishment. All forms of recognizable energy fall into one or the other of the two categories.

**The non-energy aspect.** It must be emphasized that the aether units themselves, contrary to popular expectation, are NOT energy entities. This may come as a surprise. But it is important to realize that only the change in their numbers represents energy. What this means is that (in accordance with the DSSU definitions of energy and of aether) the discrete fluctuations of the vacuum CANNOT be called quanta of energy. Units of aether, as such, are not the manifestation of quantized energy but, rather, the manifestation of what is termed the *essence process*. Aether, then, consists of *essence-process units*.

The aether that fills all space is the essence medium of the physical universe. Bulk aether is normally dynamic (it can expand and contract). However, when in a static state (no volume change, not expanding and not contracting), aether is in its *non-energy* ontological state.

Examples of how the energy definition applies to the various forms of energy in nature.

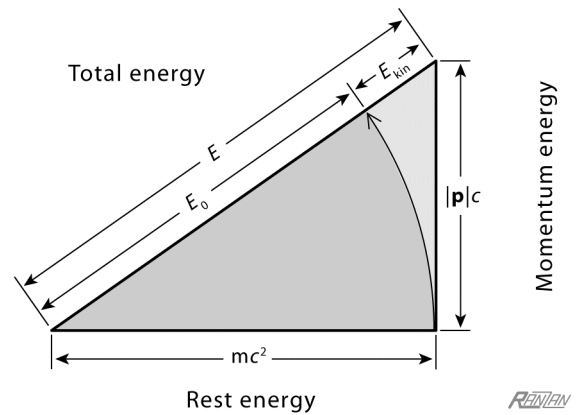
- The energy of mass, as well as radiation, at the most fundamental level, is identified with the excitation and absorption-annihilation of aether units. Mass and radiation possess energy simply because they absorb and annihilate aether.
- The energy of gravity fields, that is, the energy of *contractile-gravity* regions, is caused by the self-dissipation (vanishment) of aether units.
- The energy of Lambda, that is, the energy of the “Void” portion of cosmic gravity cells, is caused by the *addition* of aether units.

- The energy of electromagnetic fields involves a complex patterned excitation of aether accompanied by the absorption-annihilation of aether.
- In fact, anything that places stress on the aether medium tends to manifest as some kind of energy. Notable examples include the stress of gravity waves and the stress of extreme rotation (as found around gravitationally collapsed objects and in spiral galaxies).

### 3. Energy Classification

This section examines the question pertaining to the classification of particles into positive and negative forms of energy; and reveals why all matter can be deemed to represent *negative* energy.

The mechanical energy of a particle, any particle, may consist of several components: rest energy, kinetic energy, and momentum energy. Arranged into a right-angled triangle, they display a simple and most useful relationship. See **Figure 2**.



**Figure 2.** Energy triangle embodies the Pythagorean relationship among the mechanical energy components that may be associated with bodies or particles and most relevantly to elementary particles —be they mass or massless, be they stationary or moving at the speed of light.

Originally, in the historical development of particle physics, one of the solutions for the energy-of-particle equation was a representation of negative energy and the other as positive energy; but, in time, it was decided that all matter should be considered as *positive* energy.

It all started with Dirac’s search for a solution to the state of the electron and the relativistic energy-momentum relation

$$E = E_0 + E_{\text{kin}} = \sqrt{(mc^2)^2 + (\mathbf{p}c)^2} . \quad (1)$$

In the equation and in the figure,  $E$  is the total energy,  $E_0$  is the rest energy,  $E_{\text{kin}}$  is the kinetic energy,  $m$  is the mass,  $\mathbf{p}$  is the momentum, and of course,  $c$  is the lightspeed constant.

As an equation for energy  $E$ , it admits two solutions,

<sup>A</sup> DSSU is the acronym for the Dynamic Steady state Universe.

$$E = \pm \sqrt{m^2 c^4 + \mathbf{p}^2 c^2} . \quad (2)$$

“The positive root is associated with particle states, and the negative root with antiparticle states.”[4, p219] In the Dirac version of this equation, for spin ½ objects such as electrons, there are four independent solutions [4, p217].

Now, notice carefully that the interpretation of the two solutions is not of one being *positive* energy and the other being *negative* energy. Physicists do not claim that matter and antimatter represent opposite forms of energy, one positive and the other negative. *Both particles and antiparticles are considered to be the same form of energy* —strictly positive energy.

The same “form of energy,” yes; but why positive?

The question is *What determined the sign assignment?* — Why make the energy positive instead of negative? The standard sign designation is not imposed by the above energy equation! It turns out to be an arbitrary choice; it is merely an assumption; and it could just as easily have been the reverse. (The signs in the “four independent solutions” could simply refer to other qualities such as plus and minus charge, or spin-up and spin-down.)

Theorists, long ago (1940s, Stuckelberg and Feynman) decided to place particles and antiparticles on an equal footing —both were deemed to represent positive energy. Physicist David Griffiths, in *Introduction to Elementary Particles*, describes how Stuckelberg and Feynman provided a way around the intractable problem of infinite energy radiation predicted with the negative energy solution. “In the Feynman-Stuckelberg formulation the negative energy solutions are reexpressed as *positive-energy* states of a *different particle* (the positron); the electron and positron [as a particle and antiparticle pair] appear on an equal footing ...”[4, p21]

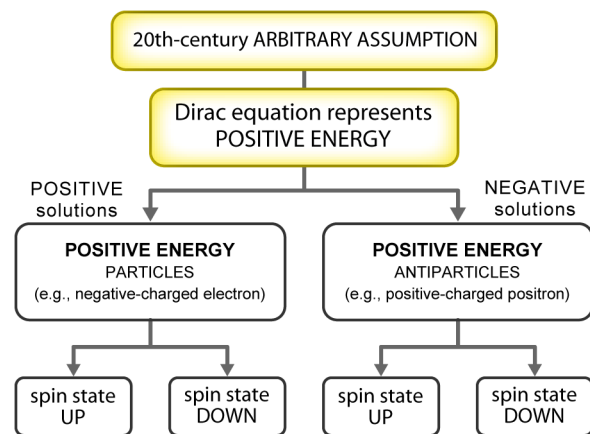
Incidentally, the reason why the “negative solution” was not considered to represent negative energy was mainly mathematical. If the positive solution  $+\sqrt{m^2 c^4 + \mathbf{p}^2 c^2}$  is taken as positive energy and  $-\sqrt{m^2 c^4 + \mathbf{p}^2 c^2}$  is taken as negative energy, it would mean, given the natural tendency of every system to evolve in the direction of lower energy, that the electron, for instance, would ‘runaway’ to increasingly negative states. According to the mathematical interpretation, the electron in this process would *radiate an infinite amount of energy* [4, p18]. Nevertheless, Paul Dirac’s early view was that electrons could have positive and negative energy states.

The Paul Dirac version of the relativistic energy-momentum equation allows for four independent solutions.

Here is the basic definition of the Dirac equation: A relativistic wave equation for an electron in an electromagnetic field, in which the wave function has four components corresponding to four internal states specified by a two-valued spin coordinate and an energy coordinate

which can have a positive or negative value [5]. The Dirac equation provides a description of elementary spin ½ particles, such as electrons, consistent with both the principles of quantum mechanics and the theory of special relativity.

The importance of the Dirac equation is that it allows for two classes of objects: particles and antiparticles. Furthermore, each of these may have two spin states (spin up and spin down). The 20<sup>th</sup>-century interpretation for spin ½ particles is charted in **Figure 3**. Categorically, both positive and negative solutions represent POSITIVE energy. Quoting from the textbook by David Griffiths and retaining his emphasis: “... we now interpret the ‘negative energy’ solutions as representing *antiparticles* with *positive* energy.”[4, p217]



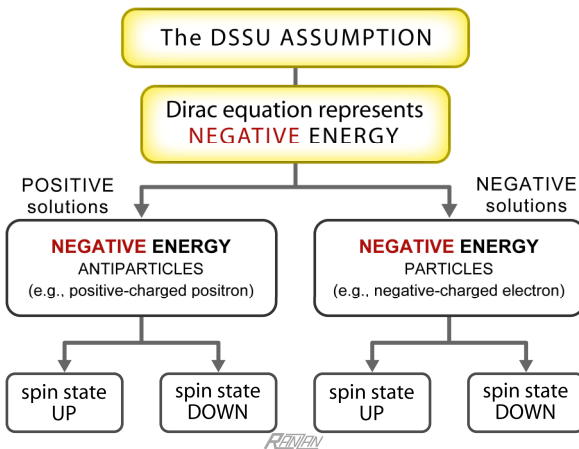
**Figure 3.** Twentieth-century interpretation of the Dirac energy-state equation. The initial assumption is that the equation represents *positive* energy. The equation has two sets of solutions. The positive solution is associated with *particle* states. The negative solutions, as physicist David Griffiths made quite clear, “... we now interpret the ‘negative energy’ solutions as representing *antiparticles* with *positive* energy.”

The physical interpretation of the Dirac equation, “while providing a wealth of information that is accurately confirmed by experiments, nevertheless, introduces a new physical paradigm that appears at first difficult to interpret and even paradoxical. *Some of these issues of interpretation must be regarded as open questions.*”<sup>B</sup>

Theorists had made the assumption that the Dirac equation represents *positive* energy. However, they could just as easily have declared that the Dirac equation represents *negative* energy! But, of course, they did not; which is unfortunate —unfortunate because it placed matter-energy in opposition to gravitational energy. In effect, it delayed the recognition of the connectedness between the two —the one was wrongly believed to be positive and the other was correctly believed to be negative.

<sup>B</sup> Dirac Equation, Wikipedia, [http://en.wikipedia.org/wiki/Dirac\\_Equation](http://en.wikipedia.org/wiki/Dirac_Equation) (accessed 2012/4/13)

Reversing the historical assumption. In the physical interpretation in accord with DSSU theory, matter is deemed to represent *negative* energy. There appears to be nothing preventing the implementation of the following interpretation as presented in **Figure 4**.



**Figure 4.** DSSU physical interpretation of the Dirac equation. Here the initial assumption is that the equation represents *negative* energy. Both sets of solutions also represent *negative* energy. The positive solution is associated with *antiparticle* states. The negative solution is associated with *particle* states.

With the revised interpretation, the electron and its twin, the positron, can be classified as negative energy. Since the Dirac formulation applies to all spin  $\frac{1}{2}$  quantum objects, they can all be classified as negative energy.

Thus, all fermions (particles with the spin  $\frac{1}{2}$  property) represent negative energy.

But it is possible to go further. As will be shown next, *all* matter can be deemed to represent negative energy.

#### 4. Photon Unifies Negative Energy

The photonic theory of particles (both mass and radiation particles) appears to have originated with James H. Jeans early in the 20<sup>th</sup> century. He may well have been the first to realize the fundamental nature of mass; mass is essentially a state of photon confinement, various configurations of self-looping waves of light. He wrote, in 1931:

“The tendency of modern physics is to resolve the whole material universe into waves, and nothing but waves. These waves are of two kinds: bottled-up waves, which we call matter, and unbottled waves, which we call radiation or light. The process of annihilation of matter is merely that of unbottling imprisoned wave-energy and setting it free to travel through space. These concepts reduce the whole universe to a world of radiation, potential or existent, and it no longer seems surprising that the fundamental particles of which matter is built should exhibit many of the properties of waves.”[6]

Modern champions of the photonic theory of particles

include physicists John G. Williamson and M. B. van der Mark. They have presented compelling evidence that the electron is composed of a confined photon [7] [8]. It has been clearly demonstrated that when a photon doubles back on itself, confines itself into a one-wavelength double loop, the photon configuration (i) acquires mass, (ii) generates an electric field—a *concentric* electric field, and (iii) generates a magnetic dipole. Thus, a self-orbiting and suitably-polarized photon provides an exemplary model of the electron and its antiparticle. And by predicting differing configuration patterns, the theory may be extended to all particles of mass. Furthermore, it turns out that the strong-force particles (gluons) are not needed; they can simply be replaced by the principle of *loop completion*.

As will be explained in a moment, even the neutrino, the other ubiquitous radiation particle, fits nicely into the photonic particle theory.

The premise whereby mass exists as ‘bottled’ radiation appears to be wholly justified and overcomes some serious problems in the standard model of particles. By unifying all mass and radiation particles (including the neutrino), it greatly simplifies our understanding of material ontology. Accordingly, the premise of the *primacy of the photon* has been adopted into the framework of the argument being presented—of energy unification and energy conservation.

The rationalization can be summarized as follows: The electron (and the positron) represents negative energy (per **Figure 4**), and by extension, its electric and magnetic fields as well. The electron consists solely of a trapped photon. Therefore, photons must also be classified as manifesting negative energy. Moreover, since all mass particles are configurations of photons, then it must be that all mass represents negative energy.

Now, can this logic chain be extended to all matter?

In this classification scheme, where stands the neutrino, a particle with no mass, just pure energy? Second only to the photon itself, the neutrino is the most abundant energy particle in the universe. It so happens that the neutrino is a neutralized packet of electromagnetic energy—essentially two equal-wavelength photons ‘locked’ together while maintaining a phase offset of  $\pi$  radians ( $180^\circ$ ). In other words, neutrinos are cleverly concealed double photons [9]. Neutrinos, then, must also be classified as negative energy.

Putting the pieces together: Mass and antimass, leptons and baryons, electromagnetic radiation and neutrinos, all are either free-radiation particles or confined-radiation particles. All are manifestations of negative energy. All are brought about by the Universe’s only fundamental energy particle—the photon.

The photon is the unifier of all Negative energy. It manifests this energy *directly* in the form of mass and radiation particles—by virtue of the fact that all matter consists entirely of photons. See **Table 1**.

The photon is also responsible for Negative energy *indirectly*. In this guise, the photon generates the energy of

gravitation. This is by virtue of the fact that all mass possesses a gravity field. Simply put, the negative energy of mass produces the negative energy of gravity. The photon’s indirect influence extends to any energy component involving an *indirect* loss of aether. For example, coulomb energy involves charged particles, in the *direct energy* sense, as well as an electromagnetic field in which there occurs an additional *indirect* loss of aether —an indirect manifestation of Negative energy.

It should be pointed out, however, that the photon is *not* necessarily responsible for fundamental Positive energy.

**Table 1.** The photon, a negative energy particle, unifies all Negative energy —directly via matter and indirectly via fields (regions of stress-induced aether loss).

Photon is responsible for ...	
Negative Energy (DIRECTLY)	Negative Energy (INDIRECTLY)
<ul style="list-style-type: none"> <li>• Mass</li> <li>• Antimass</li> <li>• Radiation, including neutrinos</li> <li>• Coulomb energy</li> <li>• Electromagnetism</li> <li>• Thermal energy</li> </ul>	<ul style="list-style-type: none"> <li>• Gravity</li> <li>• Electromagnetic field energy</li> <li>• Any other stress-induced loss of aether</li> </ul>

As a general conclusion, the photon, directly and indirectly, is the key component of all fundamental Negative energy. Essentially, it (the photon) is the energy of the universe’s physical realm.

We next consider another unifier —the unifier of the physical *and* sub-physical realms.

### 5. Aether Unifies Positive and Negative Energy

The photon, whether propagating in the free state or in the confined state, owes its existence to the excitation-absorption-annihilation of aether. Understand that photon propagation is a process of aether excitation accompanied by aether destruction; aether excitation followed immediately by aether vanishment. The process applies to any form, or guise, of electromagnetic radiation. Essentially, the photon is a consumer of aether and a major cause of the self-dissipation of aether. For the record, another cause of aether self-dissipation is the presence of significant rotation (involving excessive shear-stressing of aether). In this sense (rooted in the photon’s mode of existence and the space-medium’s stresses), the aether is fundamentally responsible for ALL Negative energy.

Turning to the connection between aether and Positive energy: In terms of modern cosmology, Positive energy is the expansion of the essence medium. Simply put, it is the emergence or quantitative growth of aether. This axiomatic emergence of aether (non-ponderable non-energy aether) is Nature’s only manifestation of positive energy. Physicists recognize the existence of this energy and generally call it Lambda or *vacuum energy*, but are uncertain (even baffled) about the cause. As mentioned earlier, Lambda is the energy

of the Void portion of cosmic-scale gravity cells and is actually the process of the *addition* of aether units.

The unification here is obvious. By supporting the photon’s unique mode of existence, on the one hand, and by the *sui generis* fount process, on the other; *aether is the unifier of all energy* —Positive and Negative, as summarized in **Table 2**. It should be emphasized; this fount process is extraordinary indeed, for it is Nature’s only Primary Cause process. Long unrecognized as such, it is Nature’s *Causless* process. The Table lists all the manifestations of Negative energy in the right-hand column and the sole manifestation of Positive energy in the left-hand column. A word about gravity’s position: Because mass/matter has been categorized as Negative energy and mass/matter produces the gravity effect, it is only logical that gravity is also classified as Negative energy. Also note, *contractile* gravity has been specified in order to distinguish it from *divergent* gravity, the effect illustrated earlier in **Figure 1**. Whatever the process, aether is the fundamental unifier.

**Table 2.** Aether is the fundamental unifier of all forms of energy —Positive and Negative.

Aether is responsible for ...	
Positive Energy	Negative Energy
<ul style="list-style-type: none"> <li>• Lambda (the formation of new aether)</li> </ul>	<ul style="list-style-type: none"> <li>• Mass and antimass</li> <li>• Radiation, including neutrinos</li> <li>• Coulomb energy</li> <li>• Electromagnetism</li> <li>• Electromagnetic field energy</li> <li>• Thermal energy</li> <li>• Contractile gravity</li> <li>• Gravity amplification caused by extreme rotation</li> <li>• Any other stress-induced loss of aether</li> </ul>
Defining feature: Aether source	Defining feature: Aether sink

**Table 3.** Conventional classification of various forms of energy into Positive and Negative categories.

Energy Balance Sheet Twentieth-century physics	
Positive Energy	Negative Energy
<ul style="list-style-type: none"> <li>• Lambda (as dark energy)</li> <li>• Lambda (as Einstein’s cosmological constant)</li> <li>• Vacuum energy (per quantum and string theories)</li> <li>• Mass, radiation, neutrinos</li> <li>• Coulomb energy</li> <li>• Electromagnetism</li> <li>• Electromagnetic field energy</li> <li>• Thermal energy</li> </ul>	<ul style="list-style-type: none"> <li>• Contractile gravity</li> </ul>
Problems: Various	Problem: Cause is missing

Now let us briefly examine where the experts of the previous century went wrong. According to the generally accepted way of accounting for the energy content of the universe, the energy associated with gravitation was considered to be negative and all the other kinds were

considered to be positive, as shown in **Table 3**. The historical classification of gravitation as a form of Negative energy was a good choice. It logically served as the opposite to Lambda (Positive energy). But how did mass and radiation end up on the Positive side of the Table? As was explained earlier, it was the arbitrary choice made in connection with the solution to the Dirac equation during the historical development of particle physics.

See the problem here? With the 20<sup>th</sup>-century view, there is a serious disconnect between mass/matter and gravity. The energy of matter and the energy of gravity are intimately connected at the fundamental level (both consume aether), and yet they have been placed in opposition to each other — separated into opposite categories. (Based on the new understanding of the energy process, one can see that there is no compelling reason for assigning a *Positive* qualifier to most of the various forms of non-gravitational energy.)

This “disconnect” is the main reason that 20<sup>th</sup>-century scientists were unable to resolve the question of energy conservation on the grandest scale.

## 6. Cosmic-Scale Energy Conservation

### 6.1. Energy conservation on the material level of existence

All energy of the *material realm*, as argued in Section 4, is tied to the photon. Because of this unifying feature, the establishment of a law of energy conservation for the entire physical domain is greatly simplified. All that is required is the existence of a balancing mechanism (a harmony of opposites) between photon energy loss and photon energy gain. Ideally it should be a perpetual and steady-state set of processes.

It turns out, the required opposing processes do exist (**Table 4**). The energy gain is brought about by the *blueshifting process* within the surface of Terminal stars (end-state neutron stars), as explained in references [9] and [10]. The process shortens the wavelength of trapped photons and neutrinos; resulting in energy gains with no theoretical limit. (As a quick reminder, the neutrino is a pair of photons ‘locked’ together in a pattern of destructive interference. Photonic energy is indeed present; but no electromagnetic energy is detectable. Neutrinos manifest no external electromagnetic effects.)

Meanwhile, the energy loss is brought about by two separate and distinct processes. One is familiarly called the cosmic redshift; but technically known as the *velocity-differential redshifting process*.<sup>[11][ 12]</sup> The other is *mass extinction via aether deprivation*.<sup>[2]</sup> This unique process brings about the utter vanishment of photons existing in the confined state (or as James Jeans referred to it, “in the bottled state”) and subjected to the conditions present only in Terminal stars.<sup>C</sup>

It is important to note that the three processes listed in the **Table 4** do not represent any sort of transfer of energy in the conventional sense. The energy gain via the blueshifting process is not the result of some interaction with some other form of physical energy. The energy losses via the redshifting process and the mass-extinction process do not result in the manifestation of some other form of physical energy.

Everything else beyond the three processes stated in **Table 4**, every other activity, every other process, is classified as an energy-conserving transformation or conventional-law-obeying interaction. Among the “other activities” should be mentioned the conversion of radiation to mass; and the conversion of mass to photons and to the energy of neutrinos. Also worth mentioning, since photons do carry momentum, is that photonic energy can be transformed into kinetic energy.

There is something else to note. Turning briefly to one of the listed “energy loss” items in the Photon Energy table. Undoubtedly, the *mass extinction process via aether deprivation* is a most unusual energy process. It involves the photon, in the form of mass, but does not appear in energy Table 1 (which charts the photon’s connection to energy), nor does it appear in energy Table 2 (which charts the aether’s connection to energy).

So, why does the mass extinction process not appear in the Photon categorization Table 1? ... Because it is a process of the removal/extinguishment of photons —something for which the photon is NOT responsible. Rather, it is the victim. One cannot say, as called for in the table’s title, the “Photon is responsible for ...” this process.

The mass extinction process does not appear in the Aether categorization Table 2. The reason? Because it is a process that happens as a consequence of the ABSENCE of aether; it is not because of some action of aether. One cannot say, as in the table’s title, the “Aether is responsible for ...” this process.

And yet, as **Table 4** makes clear, the *mass extinction process* fits perfectly into the balancing scheme for photonic energy. Although, it is not a form of photonic energy, this process, nevertheless, reduces such energy. So, the question is: How does it meet the requirements of the fundamental energy definition?

Consider a small concentric core within a Terminal star. Prior to its extinction, this mass core is an ongoing consumer of aether. Post extinction, there is no longer this consumption of aether.<sup>D</sup> Thus, there is a sudden quantitative change, a reduction, in aether consumption; and so, the

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ontological state that cannot be altered in any way other than changes of rotation. Such an object is truly in an end state of existence. It is both a destroyer of energy (specifically, mass energy) and a generator of energy (specifically, it amplifies the energy of photons and neutrinos). The defining feature: It is enveloped by an energy surface/layer onto which the space medium (aether) flows at the speed of light. Moreover, this energy layer encloses a fixed quantity of mass existing as nature’s ultimate density state.

<sup>D</sup> The lost mass of the core is, of course, instantly replaced by other mass falling inward.

<sup>C</sup> A *Terminal star* is a gravitating object in the “Terminal” state —an

fundamental definition is satisfied.

**Table 4.** Photon energy balance sheet. Photon energy is the energy that exists in the form of any and all physical particles—radiation, neutrinos, baryons, leptons, and mesons. The way that energy conservation functions in the cosmic-scale system is not by a strict unbendable law; rather, it is a self-balancing mechanism that is at work, forever tending towards a harmony of opposites.

Photon Energy (The quantized level of energy, the energy of the material realm)	
ENERGY GAIN	ENERGY LOSS
<ul style="list-style-type: none"> <li>Blueshifting process (occurs only within surface of Terminal stars; aka end-state neutron stars)</li> </ul>	<ul style="list-style-type: none"> <li>Redshifting process (occurs when traversing large and small gravity wells)</li> <li>Matter extinction process via <i>aether deprivation</i></li> </ul>
Everything else, every other activity, every other process, is classified as an energy-conserving transformation or interaction.	

Summing up the energy-conservation mechanism applicable to the material level of existence. From the perspective of process physics, it may be said that the conventional energy conservation principle is, in a profound way, superseded by *the harmony of opposite processes*.

And so, energy balance is maintained perpetually, in steady-state fashion, on the quantized (i.e., measurable or material) level of existence.

## 6.2. Energy conservation on the sub-material level of existence

Turning to the *nonmaterial realm*. All energy is tied to the aether, the medium of the *sub-physical realm*. Every manifestation of energy, at the most fundamental level, involves a change in the quantity of aether units. Aether is the unifier and, hence, facilitates the establishment of a simple conservation law, this time for the entire sub-physical domain. All that is required is the existence of a balancing mechanism (another harmony of opposites) between aether loss and aether gain. This simply means the existence of a quantitative equilibrium between aether emergence and aether vanishment—a self-balancing tendency.

**Table 5** shows the gain-and-loss balance sheet for aether—the fundamental sub-physical component of energy. Aether gain comes about via an axiomatic emergence process. As mentioned earlier, it operates as the Universe's Primary process. That is to say, it proceeds without prior cause. The profound implication is that this emergence process makes the entire energy mechanism a *perpetual* system.

Every other energy manifesting process operates on the basis of aether consumption and, hence, falls on the “loss” side. This includes the enigmatic process of excitation-absorption-annihilation of aether by matter, as required to sustain the very existence of such matter. And it includes the most prodigious loss mode of all, the *self-dissipation* of aether—the process that maintains the efficacy of the

contractile gravitational field. Moreover, the loss side encompasses any other stress-induced loss of aether, notably the shear stress of significant rotation.

**Table 5.** Fundamental level of energy balance sheet. One *essence* process, the source-energy process, is balanced by two consumptive processes. The conservation manifest in what functions as a cosmic-scale system is not a strict unbendable law; rather, it is a self-balancing mechanism that is at work, forever tending towards a harmony of opposites—between aether emergence and aether vanishment.

Fundamental Level of Energy (The subquantum realm)	
Positive side AETHER GAIN	Negative side AETHER LOSS
<ul style="list-style-type: none"> <li>Emergence of <i>aether</i>* (colloquially the expansion of the vacuum or space medium)</li> </ul>	<ul style="list-style-type: none"> <li>Excitation-Absorption-Annihilation of aether by matter (as required to sustain the very existence of such matter)</li> <li>Self-Dissipation of aether—the process that occurs as a consequence of the stresses suffered in conjunction with contractile gravity and rotation</li> </ul>
* As defined by DSSU theory	
Definition: <b>Fundamental process of energy:</b> is defined as any quantitative change in the number of fundamental fluctuators (the discrete units of nonmaterial aether).	

## 7. Summary and Conclusions

To answer the question from the opening discussion, *Where did the kinetic energy of the diverging galaxies come from?* It came from the sub-physical realm in the guise of Positive fundamental energy.

It is worth noting that there are two fundamentally different ways by which Nature generates the energy of motion:

- The noninteraction way, as illustrated in **Figure 1**. It begins purely as comotion—a ‘motion’ with the aether. The kinetic energy really only manifests when the co-conveyance ends, as eventually it must.
- The interaction way of standard physics. For example, charged particles interacting with an electromagnetic field; the release of chemical or nuclear energy; and of course, the transfer of the momentum energy from one particle/object to another.

### 7.1. Harmony of opposite processes

Because of the intimate relationship between the universe's essence medium (the sub-physical aether) on the one hand and the universe's various manifestations of physical-realm energy on the other, the conservation of energy on the cosmic scale requires two pairs of balancing mechanisms.

On a quantitative basis:

- (process of photonic energy gain)  $\approx$  (two processes of photonic energy loss)
- (process of aether emergence)  $\approx$  (processes of aether vanishment)



These relationships apply to any large region of the universe, namely to the autonomous cosmic gravity domains of the cellular universe.

In each case there is a balance between a fount process and negation or consumption processes.

The founts of photonic energy are the Terminal stars, as detailed in references [9] and [10]. The two negation processes are cosmic redshifting and matter extinction by aether deprivation, as detailed in references [12] and [2].

The fount of aether is its self-emergence. The negation processes are all the manifestations of Negative energy (**Table 2**), all destroyers of aether.

### 7.2. A two-particle universe

A remarkable implication of the cosmic-scale energy-balancing system is that all processes and all energy manifestations depend entirely on the existence of only two fundamental particles. One particle —the photon— rules the physical realm. And one particle —the subquantum aether oscillator— rules the sub-physical realm.

Aether, dynamic aether, exists. Its ontological nature is axiomatic.

Photons exist because aether exists. That is to say, aether sustains the existence of photons and (by the photonic theory of particle physics) the existence of *all* corporeal entities.

Energy exists as processes of aether. Energy also exists as processes of photons.

Thus, the Universe exists as a two-level system inhabited by only two kinds of most-fundamental particles. One of them, as described earlier, acts as the ultimate unifier. Aether underpins all mass and energy of the physical realm AND manifests the dynamics (the energy of emergence/expansion and vanishment/contraction) of the sub-physical realm.

From the ‘thermodynamics’ perspective, the Universe exists as a perpetual balance of energy between Positive and Negative fundamental energy processes.

**Positive process.** Nature has only one fundamental-level Positive energy process —the self-emergence of aether. This process takes place within the cosmic Voids.

**Negative processes.** Any activity in nature that consumes aether directly or indirectly defines this category. Examples include (1) Photonic phenomena such as mass, radiation, and electromagnetic effects, are forms of energy that manifest, at the most fundamental level, as an excitation-absorption-annihilation process —a process whereby flickering units of essence (nonmaterial aether) literally vanish. (2) The energy of a contractile gravitational field (referring to the field itself, not the objects in it) is the result of the stress induced self-vanishment of aether. (The stress arises from the convergent inflow caused by the presence of the central mass acting as an aether sink.) (3) Any other stress-induced loss of aether such as the vorticular shear stress caused by significant rotation.

In the two-particle universe, both particles enter into the

definition of fundamental-level energy. While the Positive process is exclusively the domain of aether entities, the Negative energy is the domain of both particles.

### 7.3. Evaluating validity

How do we, as truth-seekers, know the correctness of the conservation mechanism herein presented?

This mechanism in conjunction with the other laws in this series has, for the first time in history, made it possible to explain in unambiguous terms an extensive list of diverse astrophysical phenomena and observed structural features. Most notably, it has led to the resolution of what had long been the most perplexing pattern of galaxy clusters in observational cosmology. The law governing the cosmic-scale conservation of energy is an essential element for explaining and fully understanding the famous Abel-85 system of galaxy clusters.[13]

### Afterword

The present article is part of a series comprising seven works. The titles are listed below along with brief descriptions.

The Series has a dual purpose. One is to expose the adverse consequences of the failure, of 20<sup>th</sup>-century science, to exploit or incorporate the universal ethereal medium into mainstream physics. The most glaring consequences are the ongoing crises in Physics and Cosmology. The main purpose, however, is to present, under each title in the series, a substantiation and confirmation of DSSU Cosmology — historically the first true steady-state universe.

### The Laws of Physics 20<sup>th</sup>-Century Scientists Overlooked:

#### ■ Part 1: “The Velocity Differential Propagation of Light” [12]

Describes how theorists of the 20<sup>th</sup> century failed to recognize the law governing the prolonged interaction between electromagnetic radiation and gravity gradients. The historic oversight of scientists to recognize this law of redshift led to a momentous misinterpretation of Edwin Hubble’s redshift observations. Their oversight of a remarkably simple principle connecting light and gravity had revolutionary consequences —it gave birth to the preposterous expanding universe concept.

#### ■ Part 2: “Energy Generation via Velocity Differential Blueshift.” [10]

Details a truly revolutionary mechanism —Nature’s fundamental energy amplification process, the source process in Nature’s limitless font of energy. Explains the mechanism by which aether powers astrophysical jets. Remarkably, aether is the driver in the extraction of energy from the inner side of the critical boundary of gravitationally collapsed stars known as Terminal stars or *end-state neutron*

stars.

■ **Part 3: “Noninteraction Mass-to-Energy Conversion”** [14]

Describes the mechanism of total mass-to-energy conversion—a process whereby 100 percent of the mass is converted to radiant energy without involving particle-antiparticle annihilation! ... It is about extreme gravitational collapse and the outcome—*Terminal stars* and *end-state neutron stars*. Using only basic physics and dynamic aether, the article follows a logical sequence in explaining how mass converts to energy and how that conversion leads to the resolution of long-standing paradoxes of stellar black holes.

■ **Part 4: “Mass Extinction by Aether Deprivation”** [2]

This article addresses the question of excess matter. Given that a contiguous mass of less than 3.4 solar masses is insufficient to form a lightspeed boundary; and given that this same mass is just sufficient to form such a barrier; the question then is *What happens if the collapsing body is greater than 3.4 solar masses? Significantly greater?* And, say, none of the material is outwardly expelled. ... Twentieth-century scientists never did find the answer.

■ **Part 5: “Centrifugal Effect Negation”** [15]

It is explained how rotational motion with respect to the universal space medium (aether) determines the centrifugal effect. The article details the conditions involved in the attenuation of the Effect; and the extreme condition under which complete negation occurs. Revealed is the fundamental law governing circular motion and its importance to the structural cohesion of spiral galaxies *without the need for so-called dark matter*.

■ **Part 6: “Cosmic-Scale Conservation of Energy”** [16]

Presents the workings of the long-overlooked mechanism. Reveals how Cosmic-scale energy conservation is maintained by balancing the relevant processes of two distinct realms—the physical and the sub-physical.

■ **Part 7: “Steady State Cosmic Structure”** [Publication pending]

This article shows how a combination of the various overlooked laws lead to the sustaining of cosmic structure—specifically of a dynamic steady-state cellular structure. It is an exploration into the operation of the Universe that reveals an astonishingly accurate match between theory prediction and physical evidence—a wonderful correspondence between expectation and the actual observational cosmic-scale structure.

A planned book version of these Overlooked Laws of Physics will also include a unified theory of gravity, one that is entirely based on a very specific kind of dynamic aether (foundational to DSSU theory). The **Aether Theory of Gravity** to be presented therein is a remarkably elegant unification of the five manifestations of gravity [17]. This aether-gravity theory serves as the foundation of the series of overlooked laws, and also as the framework tying the whole

Series together into a comprehensive and validated cosmology.

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