The Mystery of Dark Energy and Dark Matter

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Abstract

This paper challenges the standard cosmological interpretation of dark energy and dark matter, arguing that it rests on a conceptual misunderstanding of physical causality. Instead of invoking unknown forms of energy or negative pressure within the framework of the expanding ΛCDM model, the text highlights the electromagnetic structure of matter and the role of large-scale plasma currents, Birkeland filaments, charge separation, and long-range electric potentials in a spatiotemporal process. Redshift, filamentary cosmic networks, and stellar luminosity are interpreted as electrical phenomena within a dynamic, plasma-filled volume. The observed broadening of spectral lines—particularly the H-alpha line—is cited as evidence of light-wave damping by electrons rather than Doppler expansion. Within this ontological framework, the assumption of dark energy becomes unnecessary, and cosmic dynamics can be explained through established electromagnetic principles.

1.Introduction

Energy is the fundamental category of physics. A society's entire endeavors revolve around energy supply. It is therefore all the more important to understand the origins of energy. In recent years, the concept of energy has often been misinterpreted. In mechanics, there are two distinct types of energy: kinetic energy and potential energy—which is addressed through potential theory. We obtain kinetic energy when we decelerate masses. *Mass* is a portion, just as a quantum is. The difference lies in the fact that the mass of objects is compared against a reference mass, whereas a quantum is counted.

Here is an example: You want to buy screws at a hardware store. You might count out a few screws. But if you need a large number of them, you would use a scale to weigh them and then pay the price per kilogram at the checkout. Thus, mass is a value defined in relation to the kilogram standard kept in Paris, whereas a "quantum" represents a countable quantity of items.

An energy-generating process comprises three phases of motion: the energy source, where the mass is accelerated; momentum transfer at constant velocity; and the energy sink, where the mass is decelerated and thereby exerts its effect. We understand energy itself as a sequence of impulses.
But what is *matter*? In philosophy, matter is understood as everything that exists outside our consciousness. To apply the concept of matter correctly as a physicist, one must state that **matter is mass in motion**. We are already familiar with three phases of motion regarding translation; however, phases of rotation dominate in the cosmos.

Proponents of the standard model of cosmology use the term *Dark Energy* to refer to a supposedly unknown form of energy that permeates space and exerts negative pressure, thereby accelerating the expansion of the universe. This is said to differ from *Dark Matter,* which exerts a gravitational effect but does not accelerate the expansion. However, this premise assumes that the universe is a closed space with discernible boundaries. The description of dark energy contradicts the concepts introduced earlier. Pressure is a radial force acting in all directions; there is no physical explanation for negative pressure. Space is characterized by a vacuum that is not truly empty; the presence of electric plasma ensures the existence of a certain gas pressure, which can vary significantly depending on the distance from stars. Thus, an attempt is being made here to explain something incomprehensible with something even more incomprehensible—simply because academics refuse to acknowledge that, within a mathematical framework, matter consists of positive and negative charge carriers whose various combinations generate the six fundamental motions of mechanics: force, momentum, and translational energy for translation; and torque, angular momentum, and rotational energy for rotation.

Since physics chairs are specialized and evidently organized like small fiefdoms, there is no exchange of knowledge between them. It is thus no surprise that Leonhard Euler's mechanics plays no role in cosmology, even though everything in the heavens rotates. To address this, Albert Einstein had to invent the curvature of space—a jest that academic physics took seriously. Between roughly 1896 and 1909, he could have accessed Euler's *Mechanica* [1]via the libraries of ETH Zurich, the University of Zurich, and the Swiss National Library—specifically in the form of the collected scientific editions common at the time, rather than the original 1736 printing.

Standard cosmology replaces physical causes with mathematical terms. *Negative pressure* is not a physical process; rather, it is symbolized by the parameter lambda in the field equations—a parameter introduced to model the observed redshift in galactic spectra. No physical cause is specified. One often reads the following explanation: "*In standard cosmology, Λ is currently interpreted as a temporally constant vacuum energy density that exerts a repulsive effect on spacetime, thereby explaining the accelerated expansion of the universe.*" This is very vague. Which time is meant here—time within space, or a time independent of space within the four-dimensional construct known as spacetime? In that case, the fourth coordinate would be entirely superfluous. The term "energy density" evidently refers to the charge density of a potential. This becomes clear from the subsequent statement: "*In the energy-momentum tensor of general relativity, energy density is associated with the time component of the four-vector. Due to the equivalence of mass and energy, it assumes the role of mass distribution.*" Without an uneven distribution of charge, there is no potential, no motion, and no kinetic energy. Yet standard cosmology recognizes only the radial gravitational force exerted by charges bound within atoms; it does not account for the free, moving charges that drive cosmic dynamics.

2. The Dynamics of Matter

Heraclitus of Ephesus observed long ago that reality is subject to constant change. His dictum "Πάντα χωρεῖ καὶ οὐδὲν μένει" ("Everything moves on and nothing remains") has retained its validity over the millennia. For physics, therefore, matter signifies mass (of elementary particles) in motion. In this context, mass is merely a quantity, not a property; the actual property is the elementary electrical charge. Modern physics overlooks this fact and erroneously portrays mass as a property. We can measure the states of motion of matter using the mass m of a substance and its positive or negative acceleration, as well as its constant velocity v.

The mechanics of Isaac Newton and Leonhard Euler teach that energy is composed of translational and rotational components, specifically such that the translational velocity is perpendicular to the rotational angular velocity ω. In the case of rotation, it must be noted that the moment of inertia

1 L. Euler, *Mechanica sive motus scientia analytice exposita*, Academiae Scientiarum, Petersburg, 1736.

tensor Θ—representing the distribution of mass relative to the axis of rotation—takes the place of mass. Electromagnetic induction represents the fastest form of momentum transfer. According to John Clerk Maxwell, it occurs at the speed of light because it involves no transport of mass. Einstein's energy equation $E = m\cdot c^2$ must be understood as a limiting case. The higher the velocity, the lower the moving mass; this follows from the conservation laws for energy and momentum. This leads to formula (1) for the energy.

$$\lim_{\substack{v\to c \\ m\to 0}} m\cdot v^2 \Rightarrow \frac{m}{2}\cdot v_T^2 + \frac{\Theta}{2}\cdot \omega^2 \qquad (1)$$

It is remarkable that modern astrophysics persistently overlooks the rotational component of energy, even though rotation accounts for the majority of observed motions in the cosmos. The rotational component lengthens the resulting path, simulating time dilation in the translational motion, as Klaus Gebler demonstrated using the example of cosmic muons.[2]

In (1), the velocities $c^2 => v_T^2 + (r\omega)^2$ form a Pythagorean triangle with an electron velocity less than c as the hypotenuse. Translational momentum and angular momentum are perpendicular to each other and possess the property of propagating through the material medium. Figure 1 shows the visual representation of (1).

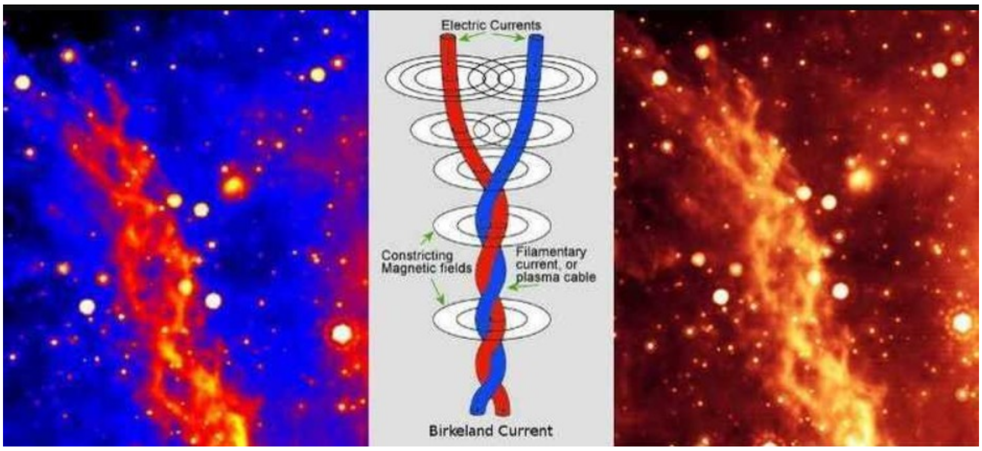

Figure 1: Birkeland currents in the cosmos

It is precisely in this manner that the plasma moves through the cosmos as Birkeland currents, as images from the James Webb Telescope show.

This type of motion was already modeled by the force equation of Oliver Heaviside[3] (1889) and Hendrik Antoon Lorentz[4] (1895), which incorporates both a translational electric force component and a rotational magnetic force component. In this context, force represents the acceleration of quantities of charge (quanta or masses) in a potential, whereas transmission—momentum—involves no force at constant velocity. In Earth's orbit, this force-free state is referred to as weightlessness. Forces are usually designated differently depending on their point of origin, yet all are measured in

2 K. Gebler – *Die übersehene Rotation – Physik erklärt moderne Theorie-Phänomene;* Verlag BoD Hamburg ISBN 978-3-6963-9805-7

3 O. Heaviside - *On the Electromagnetic Effects due to the Motion of Electrification through a Dielectric*, Philosophical Magazine, 1889, S. 324

4 H. A. Lorentz - *Versuch einer Theorie der electrischen und optischen Erscheinungen in bewegten Körpern*, **E. J. Brill**, **1895**. 138 S.

the same way. Why, then, make a distinction when they all share the same root cause in the charge composition of elementary particles? From a physical standpoint, there is no reason to distinguish between them. Mechanics does not explain the cause of force. Even the Big Bang cannot obscure the fact that it ultimately fails to explain the beginning of a causal chain.

In contrast to the Standard Model, the Electric Universe theory posits a static, plasma-filled volume representing the observable universe; the redshift of spectral lines within this framework is only negligibly influenced by the Doppler effect, given that cosmic masses can only attain speeds below one thousand kilometers per second—far below the upper speed limit of approximately 300,000 km/s represented by the speed of light.

The Doppler effect accounts for redshift values up to approximately z = 0.03. However, redshift values as high as 7,6[5] have been observed, particularly in quasars. The primary component of the redshift is caused by the attenuation of radiation interacting with electrons of the cosmic plasma. This is evidenced by the fact that the spectral line peak broadens due to this attenuation and simultaneously shifts toward lower energies. In contrast, since the entire radiation source moves in the Doppler effect, that phenomenon does not alter the shape of the spectral line. Figure 2 plots the ratio of line width to redshift for the Hα line of a mature galaxy at each data point. If the Doppler effect were the cause, the red lines in Figure 2 would run parallel to the abscissa. These findings also align with Halton Arp's observations of quasars located near galaxies, where the redshift increases the closer the quasar is to the galaxy.

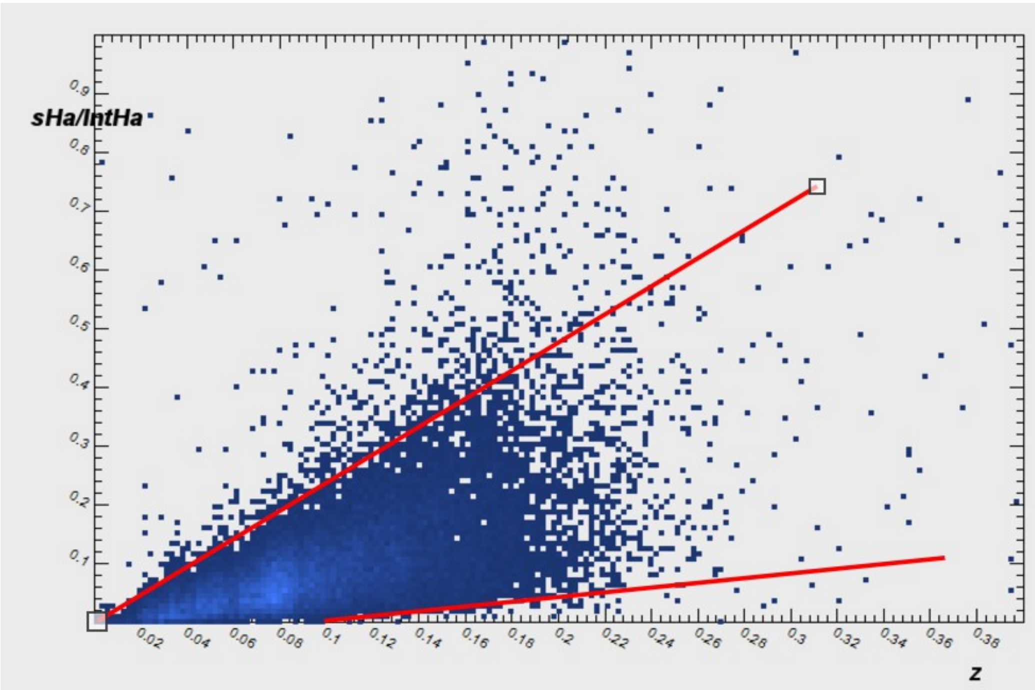

Figure 2: Relative broadening of the H-Alpha line in the spectra of adult galaxies with their redshift.
Querying the SDSS Database Release 7; Hüfner 2014

Observations have further shown that galaxies are distributed throughout space in a network-like pattern within vast, helical Birkeland currents.

5 Feige Wang,a. o. - *A Luminous Quasar at Redshift 7.642*. In: *The Astrophysical Journal*. 907. Jahrgang, Nr. 1, 14. Januar 2021

Astrophysics generally treats rotation as a secondary factor, even though it is the dominant form of motion in the cosmos. Neglecting rotational energy leads to errors in estimating the stability, structure, and energy balance of cosmic objects.

3. Electric power sources

In the Electric Universe theory, the causal chain begins with electric charge—in its positive and negative forms—and the tendency toward neutralization. In this framework, gravity is the residual force resulting from bound charges within the atomic nucleus, as Ottaviano Fabrizio Mossotti[6] had previously hypothesized but was unable to prove. Poisson's equation states that charge distribution is the source of the potential energy.

$$\nabla^2 \Phi = -\frac{\rho}{\varepsilon} \qquad (2)$$

Potentials in a material medium generate fields for the transmission of momentum. Material fields have nowadays replaced the old concept of the ether. Thus, the electric field E(r) is the gradient of an electric potential. According to the first Maxwell equation, one can also write

$$\vec{\nabla} \cdot \mathbf{E}(\mathbf{r}) = \frac{\rho(\mathbf{r})}{\varepsilon} \qquad (3)$$

with the charge density $\rho(r)$ and the permittivity $\varepsilon = \varepsilon_r \cdot \varepsilon_0$

Examples include:

- Atom: Coulomb field between the electron shell and the nucleus
- Battery: electrochemical field
- Atmosphere: vertical field between Earth and the ionosphere
- Cosmic plasma: double-layer field

The potential exerts an effect by generating forces that accelerate masses.

The distinction lies in the potentials; we differ between electric and magnetic potentials associated with transverse and rotational mechanical forces. While the potentials of atomic nuclei are rigidly bound to the nucleus, the potentials of the electron shell are variable because electrons can detach from the shell and move freely.

Although the Poisson equation clearly demonstrates that charge distributions generate potentials, astrophysics completely ignores electric potentials in cosmic plasma. Instead, the plasma is assumed to be "neutral," even though any charge separation inevitably generates local currents and fields.

4. The density of the electrolyte

An electrolyte is a medium that dissociates into ions and electrons and conducts electric current. The density of the medium in which the potential has developed is the decisive parameter (in the language of standard cosmology: energy density). However, this is not because "more particles

6 J. K. F. Zöllner, W. Weber, O. F. Mossotti, - *Erklärung der universellen Gravitation aus den statischen Wirkungen der Elektricität und die allgemeine Bedeutung des Weber'schen Gesetzes* Leipzig, 1882 ETH-Bibliothek Zürich

yield more charge," but because density determines the speed and extent of charge shielding. It is precisely this shielding that determines whether a system establishes a Nernst equilibrium—consistent with the electrochemical series—or a state of disequilibrium, such as that found in the atmosphere or in cosmic plasma. The classical view held that potential fields extend to infinity; neither Coulomb nor Newton had envisaged any limits for their radial field equations. In reality, however, fields are shielded by mobile electrons. Only the weak residual forces of gravity cannot be shielded. Yet, regarding them as the shaping forces of the universe is a misconception. The density of the medium determines the Debye length—the distance that free electrons can travel. The Debye length determines whether or not an electrochemical equilibrium can be established. The Debye length λ_D is determined by formula (4).

$$\lambda_D = \sqrt{\frac{\varepsilon_0 \cdot kT}{n_e \cdot q^2}} \tag{4}$$

Equation (4) tells us how far an electric field "acts" in a medium before it is shielded by the surrounding charges. In an electrolyte with high electron density, $n \sim 10^{26}\ \mathrm{m}^{-3} \Rightarrow \lambda_D \sim 10^{-9}\ \mathrm{m}$

This results in:

- Fields are immediately
- only local potentials exist
- drift and diffusion can balance each other out
- Nernst equilibrium is possible

An electron possesses spin and a magnetic moment. Physically, this implies that it cannot exist as a point charge but only as a current loop—whether in the atomic shell or within the atomic nucleus. Consequently, the charges arise from an atomic model that views electrons as actual current structures and interprets nuclear forces electromagnetically. The Debye length can then be interpreted as the radius of such a current loop.

In this theory, neutrons are composed of protons and nuclear electrons; these do not exist as independent building blocks within the atomic nucleus but rather emerge as fragments only during nuclear decay, rendering them unstable. The fundamental element within the atomic nucleus is an elementary magnet, as shown in Figure 3, consisting of two to three protons and an electron that binds these protons. [7]All elements are listed in a nuclide chart (also known as an isotope chart or isotope table). Such a chart graphically displays all known nuclides. A nuclide is an atomic nucleus defined by its number of protons (Z) and number of neutrons (N). On the chart, the number of protons is plotted on the y-axis and the number of neutrons on the x-axis. Each point or field represents a specific nuclide—that is, an isotope of an element. Since neutrons are not considered to exist within the atomic nucleus in this model, Tables 1 and 2 present a modified nuclide chart; the abscissa plots the increasing number of nuclear electrons (N)—which neutralize the positive charge—while the ordinate plots the atomic number (Z).

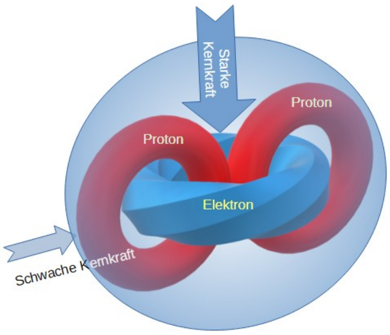

Figure 3: Fundamental building block of an atom

The atomic number indicates the positive nuclear charge, which is balanced by an equal number of negative orbital electrons. Located at the intersection of the ordinate and the abscissa is the nuclide

7 M. Hüfner – *Quantendynamik - Eine Studie für Ingenieure;* BoD-Verlag Hamburg 2026, ISBN 978-3-6957-1798-9

characterized by the sum N + Z—the mass number M. Electrons, having a mass roughly 1/1836th that of the Proton, are negligible in this context, accounting for only about 1% of the total mass in heavy elements. Since an atom establishes a state of charge equilibrium, the ratio of the mass number M to the number of nuclear electrons N provides insight into the nuclide's stability. Ideally, this ratio is close to two for a stable nuclide; in this state, the charge between the nucleus and the electron shell is balanced, rendering the atom electrically neutral. Each proton is then balanced by the charge of a nuclear electron (a small current loop) and an orbital electron (a large current loop). While spherical electrons can only repel one another, current loops can also overlap.

If this ratio deviates from two, the nuclide becomes radioactive. If (Z+N)/N < 2 (as seen in Tables 1 and 2), the nuclide tends to capture an electron from its atomic shell into the nucleus to stabilize it (red fields); it is thus β^+-active. This creates a momentary vacancy in the atomic shell, which manifests as a positron. If the ratio (Z+N)/N > 2, the nuclide is an electron emitter (blue fields); it is β^--active.

	N	Z	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Li	3		1,67	**2,00**	**2,33**	2,67	3,00													
Be	4		1,75	1,75	2,00	**1,80**	2,5	2,75								Elektronenemitter				
B	5		1,40	1,60	1,80	**2,00**	2,2	2,4	2,6											
C	6				1,67	1,83	**2,00**	**2,17**	2,33	2,50	2,67									
N	7					1,71	1,86	**2,00**	**2,14**	2,29	2,43									
O	8						1,75	1,88	**2,00**	**2,13**	**2,25**	2,38	2,50							
F	9								1,89	2,00	**2,11**	2,22	2,33							
Ne	10							1,70	1,80	1,90	**2,00**	**2,10**	**2,20**	2,30	2,40					
Na	11									1,82	1,91	2,00	**2,09**	2,18	2,27	2,36				
Mg	12										1,83	1,92	**2,00**	**2,08**	2,17	2,25				
Al	13											1,85	1,92	2,00	**2,08**	2,15	2,23	2,31		
Si	14												1,86	1,93	**2,00**	**2,07**	**2,14**	2,21	2,29	
P	15													1,87	1,93	2,00	**2,07**	2,13	2,20	2,27
S	16														1,88	1,94	**2,00**	**2,06**	**2,13**	2,19
Cl	17					Elektronenfänger										1,88	1,94	**2,00**	2,06	**2,12**
Ar	18																	1,94	**2,00**	2,06

Table 1: Excerpt from the nuclide chart according to Ebert

	N	Z	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
K	19		1,95	2,00	**2,05**	2,11	**2,16**	2,21	2,26	2,32	2,37		2,47							
Ca	20		1,90	1,95	**2,00**	2,05	**2,10**	2,15	**2,20**	2,25		2,35	**2,40**	2,45				Elektronenemitter		
Sc	21			1,90	1,95	2,00	2,05	2,10	**2,14**	2,19	2,24	2,29	2,33	2,38						
Ti	22					1,95	2,00	2,05	**2,09**				**2,27**	2,32						
V	23						1,96	2,00	2,04	2,09	2,13	2,17	**2,22**	2,26	2,30	2,35				
Cr	24						1,92	1,96	2,00	2,04	**2,08**	2,13	**2,17**	**2,21**	**2,25**	2,29	2,33			
Mn	25									2,00	2,04	2,08	2,12	2,16	**2,20**	2,24	2,28	2,32		
Fe	26		Übergangsmetalle								2,00	2,04	**2,08**	2,12	**2,15**	**2,19**	**2,23**	2,27	2,31	2,35
Co	27											2,00	2,04	2,07	2,11	2,15	**2,19**	2,22	2,26	2,3
Ni	28												2,00	2,04	2,07	2,11	2,14	**2,18**	2,21	2,25
Cu	29													2,00	2,03	2,07	2,10	2,14	**2,17**	2,21
Zn	30														2,00	2,03	2,07	2,10	**2,13**	2,17
Ga	31						Elektronenfänger											2,06	2,10	2,13
Ge	32																	2,03	2,06	2,09

Table 2: Excerpt from the chart of nuclides – transition metals

The white numerical fields in Table 1 indicate the stable isotopes. The dashed red line passes through all fields with the ideal value of 2, as this represents the state where all protons and electrons are organized into elementary magnets, as shown in Figure 2. As Table 1 demonstrates, this rule holds true up to the element argon. However, the continuation in Table 2 reveals a different situation. The white fields representing stable isotopes show values increasingly higher than two. This

implies that the atomic nuclei acquire an increasingly negative potential, prompting them to release their shell electrons more readily. They become conductive to electric currents.
If neutrons are indeed proton-electron composites, then heavy atomic nuclei with many neutrons carry more negative charge within the nuclear volume than light nuclei. Consequently, heavy nuclei become effectively more negative, which affects the ionic charge in the electrolyte.

> **The electrochemical potentials then depend not only on the electron shell and the binding energy but also on the internal charge distribution of the nucleus.**

The electrochemical series ranks redox couples according to their standard electrode potential (E) relative to the standard hydrogen electrode. Formally, it indicates the tendency of a substance to donate electrons (undergo oxidation) or accept them (undergo reduction). The Nernst equation applies here. In a typical electrolyte, the Debye length is in the nanometer range.

If the Debye length λ_D is significantly greater due to the much lower electron density n_e, the consequences are as follows:

- Fields are barely shielded
- Potentials extend over large distances
- Drift and diffusion cannot balance each other out for a long time
- High field strengths develop

In astrophysics, the Debye length is viewed merely as a measure of shielding. Its physical significance as the length of the current loops the plasma traverses to achieve neutralization is disregarded. Consequently, the existence of large-scale currents in intergalactic space is systematically underestimated. These streams emit no light, as there are hardly any obstacles in their path to halt them and thereby trigger the emission of radiation.

So James Peebles believed the cosmic medium consisted of dark matter, to which he attributed solely gravitational forces. In the 1980s, however, he grew skeptical of the assumption of dark matter in cosmological models of galaxy formation—an assumption he felt had been adopted too hastily—and sought alternatives.[8] But once ideas that are popular with the mainstream are put into the world, they are difficult to capture again, especially if they have been awarded the Nobel Prize.

Figure 4: Plaque dedicated to Kirchhoff, who unlocked the chemistry of the cosmos.

8 J. Peebles - Autobiographie anlässlich Shaw Preis: *a term that makes no sense within physics as we understand it*

5. Energy sinks and consumer networks

Wherever there are energy sources and currents, there must also be sinks for that energy. The cosmos is a vast electrical network governed by Kirchhoff's laws—specifically, the loop rule and the junction rule. According to Gustav Robert Kirchhoff—to whom we also owe the development of spectral analysis (Figure 4) —the sum of voltages in an electrical circuit (a loop) must equal zero, and the sum of currents flowing into and out of a junction must also be zero. Both rules are consequences of the laws of conservation of energy. In other words, the task is to identify energy consumers within the cosmos. In this respect, terrestrial and cosmic networks are alike.

Europa bei Nacht | Rotierende kosmische Struktur

Figure 5: Power grids – NASA images

A power plant is required on Earth to make the many lamps there light up. The cosmic lamps are the stars and galaxies in the night sky. Figure 5 shows images from NASA. The image on the right was previously published in 2007 in the journal *Spektrum der Wissenschaft*. Just like the lamps on Earth, the stars are made to shine electrically; they act as resistors within cosmic electrical circuits. This is particularly evident in Figure 5, which shows the Butterfly Nebula (M2-9) and illustrates the pinch effect occurring in a current filament.

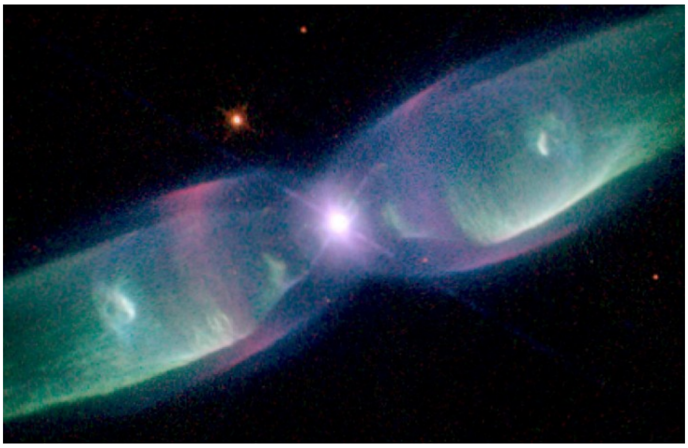

Figure 6: Butterfly Nebula image: Bruce Balick (University of Washington), Vincent Icke (Leiden University, The Netherlands), Garrelt Mellema (Stockholm University), and NASA/ESA

Resistance is greatest at the constriction—the point where the star lights up. Since energy is, of course, not lost but merely transformed, we recover part of it in the form of radiation; another portion goes into nuclear fusion within double layers—a process that is exothermic up to iron but becomes endothermic during fusion into heavier nuclei—with the energy being recovered in the form of thermal radiation upon their decay.

Astrophysics interprets stars exclusively as isolated fusion engines. The fact that stars systematically appear at filament constrictions—precisely where electrical resistance is at its peak—is disregarded. Consequently, the electrical nature of stellar luminosity is overlooked.

6. Conclusion

The observed broadening of spectral lines—particularly the H-alpha line—contradicts the Doppler model of standard cosmology. In the Doppler effect, the line shape remains unchanged. This broadening is a clear indication of damping involving electrons, rather than the expansion of space. A mathematical space, serving as a reference measure relative to a physical volume of cosmic gases consisting of hydrogen, oxygen, and nitrogen moves as an electrodynamic plasma within Birkeland currents—is neither expanding nor curved and is numerically dense. Despite immense efforts in high-energy physics, only stable positive and negative charge carriers have been found; their motion generates the magnetic fields responsible for torques within the cosmos. Gravitational forces proved to be unshieldable dipole forces exerted by bound charge carriers. The term "dark" is ambiguous in meaning. In a physical sense, "dark" refers to the exclusion of the visible spectrum of electromagnetic radiation; in a figurative sense, it implies something incomprehensible. The preceding discussion should have clarified the concepts of energy and matter.