

Chapter 9 Unified Theory of Electromagnetic Force and Energy Conversion

Section 1: Redefinition of Energy and Force

In the history of physics, electromagnetism is regarded as one of the most successful theoretical frameworks. Through Maxwell's equations, electric and magnetic fields have been described in a unified manner. Furthermore, quantum electrodynamics (QED), as a quantum field theory, has established a highly accurate theoretical system for dealing with the creation and annihilation of photons and electromagnetic interactions. However, the electromagnetic theory presented by modern physics contains several fundamental ambiguities and undefined domains.

First, the definition of “energy” itself remains ambiguous. While it is often defined simply as the capacity to do work or as a conserved quantity, such definitions fail to explain the origin of spatial structure formation and wave motion.

Second, among the phenomena classified as electromagnetic waves—such as light, X-rays, and radio waves—the principles of generation, interaction with space, propagation speed, and methods of observation are different. Nonetheless, they are all grouped under the singular term “electromagnetic waves,” even though they may not necessarily be based on the same underlying principle.

Third, the mechanical mechanism behind phenomena attributed to electromagnetic interactions (e.g., power generation, induction by moving magnetic fields, reflection or transmission of light) remains vague, regardless of the presence or absence of matter. Such effects are often described only with phrases like “the field changed” or “a magnetic field arose,” lacking detailed structural explanation.

To eliminate these ambiguities, this theory hypothesizes a fundamental structure underlying cosmic space known as the **tensor structure**. This structure possesses directionality and alignment order. In this theoretical framework, energy and waves are said to appear either when they align with this structure or when they deviate from it.

Under this framework, the following redefinition is proposed:

"Energy is a wave-like existence that deviates from the spatial tensor structure."

This concept is based on the idea that perfectly aligned waves are absorbed by space and

vanish, whereas only the deviated components remain within space, thereby giving rise to phenomena such as flow, propagation, and resonance.

Also, this relationship can be expressed as the following equation:

$$E = W_e = W - W_t$$

Where each symbol is defined as follows:

- **W:** *Wave structure as a whole*
Refers to the totality of all wave structures present in space, including all sources of origin.
- **W_t:** *Tensor-aligned wave*
The wave component that is perfectly aligned with the spatial tensor structure and is therefore absorbed into space and not observable.
- **W_e:** *Deviation wave component (Energy component)*
The portion of the wave that deviates from perfect alignment and remains in space; this component manifests as observable and effective energy.

Thus, energy is not the wave itself, but rather the amount of deviation from the spatial structure—it is the residual of a disruption in spatial order. That is, a perfectly tensor-aligned wave is absorbed into space and vanishes, while only the misaligned component remains and gives rise to phenomena such as flow, propagation, and resonance. This interpretation is based on the idea that energy is not “a substance in itself” but a “phenomenal state that appears due to misalignment with structure.”

From this structural perspective, “force” can be redefined as follows:

Force is the directional pressure experienced by spatial tensors toward alignment, and it appears as a reactionary force when alignment breakdown occurs.

This force arises as a reactive phenomenon in which space attempts to restore its alignment in response to deviations from the axis of tensor alignment. It is formalized by the following equation:

$$F = R \cdot \Delta A$$

Where:

- **F:** Reactive force in the spatial structure (response to alignment breakdown)
- **R:** Repulsion coefficient of the spatial tensor (strength of alignment recovery)
- **ΔA:** Amount of deviation from the alignment direction (*Alignment deviation*)

This equation allows us to treat force not as an abstract “field variation,” but as a concrete alignment-restoring response of the spatial structure attempting to recover order.

Furthermore, this chapter provides clear physical answers to the following fundamental questions:

- What is electric energy? What is its source?
- What reaction causes electromagnetic force?
- What is the relationship between magnetic force and spatial alignment?
- Are electromagnetic waves and light the same phenomenon?
- How is electrical power generated?
- How can the lifespan of light or radiation be quantitatively defined?

To these questions, this chapter responds with a unified explanation based on:

“Mechanics of alignment and deviation relative to the spatial tensor structure.”

The key is the four-phase process:

Alignment → Repulsion → Deviation → Residual Trace

Electricity, magnetism, electromagnetic waves, and light all correspond to different phases in this structure.

In this way, we present a new physical viewpoint that enables a unified understanding of electromagnetic phenomena as changes in the alignment state with respect to the spatial structure.

Section 2: The Three-Layer Structure of Electromagnetic Energy – Force, Pressure, and Trace

In conventional physics, electromagnetic phenomena are described through field variations such as the "electric field," "magnetic field," and "electromagnetic wave." However, the discussions on what kind of physical structure underlies each phenomenon often remain formal and abstract. For example:

- Electric energy is treated as "the movement of electrons,"
- Magnetic force is defined as "the surrounding force generated by electric current,"
- Electromagnetic waves are depicted as "waves propagating through space as oscillations of electric and magnetic fields."

However, these definitions merely describe the external appearance of phenomena, without addressing the underlying spatial structure or generation mechanisms.

In this chapter, these forces and energies are redefined through their alignment state with the spatial tensor structure, and are organized into the following three-layered structure:

Type	Definition	Polarity	Structural Classification
Electric Energy	Fundamental alignment pressure that applies directional force to spatial structure	Present (+/-)	Alignment supply source (Active)
Electromagnetic Force	Reactive directional force that emerges as a result of spatial alignment	Present (Directional)	Tensor alignment reaction force (Passive)
Electromagnetic Energy	Trace wave with no inherent directionality, storing alignment information as waveforms in space	None in principle	Informational wave / Structural trace

Through this three-layer structure, the following relationships become clear:

- Electricity is a trigger signal that indicates a new direction of alignment within the spatial tensor structure. It represents an energetic state that initiates a shift in the spatial alignment order.
- Electromagnetic force is a reactionary force that arises when the spatial tensor structure responds rotationally to forced alignment caused by electric energy or rotational motion of matter. It is a passive directional force that functions to maintain the spatial order.
- Electromagnetic energy is structural information left in space as a trace of alignment or deviation. It takes the form of a wave-like shape that has lost its original directionality.

Structural Equation of Electromagnetic Phenomena

This can be concisely expressed as the following structural equation:

$$E_{\text{total}} = E_{\text{alignment}} + F_{\text{reaction}} + W_{\text{trace}}$$

Definitions of Terms:

- $E_{\text{alignment}}$: The energy component aligned with the spatial tensor structure (corresponds to electric energy).
- F_{reaction} : The directional reactive force returned by space as a response to alignment (corresponds to electromagnetic force).
- W_{trace} : Residual wave traces left in space as a result of alignment or deviation (corresponds to electromagnetic energy).

Component Equations:

(1) Electric Energy (Alignment)

$$E_{\text{alignment}} = D \times \theta$$

- D : Density of alignment in the spatial tensor

- θ : Angle of energy input toward alignment (or alignment pressure coefficient)

(2) Electromagnetic Force (Reaction)

$$F_{\text{reaction}} = R \times \Delta A$$

- R : Restorative coefficient of space

- ΔA : Deviation from the alignment axis

(3) Electromagnetic Energy (Trace)

$$W_{\text{trace}} = S \times f \times C$$

- S : Signal strength of alignment collapse

- f : Structural frequency

- C : Coherence factor of spatial structure (amplification or attenuation)

Thus, all electromagnetic phenomena in space can be reconstructed as:

$$E_{\text{total}} = D \theta + R \Delta A + S f C$$

This represents a three-phase causal structure:

Initiation ($E_{\text{alignment}}$) \rightarrow Reaction (F_{reaction}) \rightarrow Residue (W_{trace}),

which captures the physical essence of electric forces, electromagnetic forces, and electromagnetic waves (including light).

Corresponding Phenomena

1. Electric energy supply example:

Electric currents from batteries or solar cells act as structural pressure along alignment directions.

2. Manifestation of electromagnetic force:

Objects attracted to magnets are experiencing spatial alignment, and the resulting force appears as a reaction.

3. Radiation of electromagnetic energy:

Waves such as radio, infrared, and visible light are informational traces emitted into space, lacking directionality.

Theoretical Overview

Behind this three-layered model lies the relationship between the structural density of

spatial tensors and directional pressure:

- Electric energy amplifies alignment density in tensor directions.
- Electromagnetic force arises as structural resistance against such alignment—essentially, the counterforce of space to deformation.
- Electromagnetic energy is the residual wave generated when the tensor structure breaks or deviates.

Therefore, electromagnetic phenomena are not merely observational energy categories but causal chains based on spatial mechanisms.

This layered structure is closely related to the sequential energy emission model described in the next section:

$$\mathbf{M} \rightarrow \mathbf{Q} \rightarrow \mathbf{K} \rightarrow \mathbf{E},$$

clarifying the stages and mechanisms by which phenomena like electromagnetic force, heat, motion, and electricity are generated.

Section 3: Tensor Output Model – Sequential Transformation of Energy

When an entity aligned with the spatial tensor structure undergoes collapse or deviation, there exists an ordered and staged process of energy transformation. In this theory, the sequence is defined as:

$$\mathbf{M} \rightarrow \mathbf{Q} \rightarrow \mathbf{K} \rightarrow \mathbf{E}$$

That is:

- **M (Magnetism):** The first spatial response signal arising at the moment of structural misalignment. It manifests as a sign of resonant structural breakdown.
- **Q (Heat):** The collapse causes a sharp increase in vibrational density, and localized tensor fluctuations appear as thermal reactions.
- **K (Kinetics / Motion):** Asymmetry in vibrations leads to dispersion of structural fragments or particle motion, appearing as kinetic energy.
- **E (Electricity):** During the reconstruction of fragments or structural waves along alignment directions in space, directional electrical alignment pressure emerges.

This order is understood as a *temporal output structure* of energy. These phenomena do not occur simultaneously but are generated sequentially in accordance with changes in spatial tensor alignment.

Unified Equation Expression

This process can be expressed in a simplified summation form as:

$$mT_n = M + Q + K + E$$

Where:

- **mT_n**: Total energy output generated at the moment of tensor passage or structural collapse.
- **M, Q, K, E**: Energy components corresponding to each of the above stages.

This equation does not represent a simple sum of observed energy quantities, but rather a *layered structure of energy output* based on the alignment state with space.

Structural Understanding

The core of this staged output model lies in the sequential propagation of effects within space following structural misalignment.

The moment a structure loses resonance, the loss of alignment signals propagates through space—this is perceived as *magnetic force*. Then, the vibrational density becomes extreme, giving rise to *thermal energy*. Next, the difference in energy density leads to physical displacement, which emerges as *kinetic energy*. Finally, the collapsed structure attempts to reform directional alignment within space, producing *electrical energy*.

■ Application to Real-world Phenomena

This model can be applied to a wide variety of natural and artificial phenomena, such as:

- Lightning: Breakdown of charge alignment within clouds → *Electromagnetic reaction (M)* → *Heat generation (Q)* → *Energy release (K)* → *Electrical discharge (E)*
- Volcanic Eruption: Pressure buildup in tectonic plates → *Structural collapse (M)* → *Rock heating (Q)* → *Eruption motion (K)* → *Electrification phenomena (E)*
- Artificial Power Generation: Disruption of spatial alignment due to rotating magnetic fields (M) → *Thermal loss (Q)* → *Conversion to kinetic energy (K)* → *Electric power alignment (E)*

■ Theoretical Positioning

The $M \rightarrow Q \rightarrow K \rightarrow E$ model lies at the core of this theory's explanation of phenomena through "tensor alignment and its deviations." Conventional physics treats magnetic force, heat, motion, and electricity as separate phenomena, but in this framework, they are redefined as sequential phases of one and the same spatial structural transformation.

This structural model leads directly to the next section, which explores the principles behind electricity generation and the distinction between light and wave phenomena.

Section 4: Principles of Electricity Generation — Breakdown of Alignment and Reactive Pressure

[1] Theoretical Background: Meaning of Alignment and Repulsion

Within the spatial tensor structure, all energy originates from an aligned state. When energy maintains an orderly direction, pressure, and resonance, it remains stable. However, when this alignment breaks down, space attempts to repair the disorder. This restorative reaction—what we define as *repulsive pressure*—is the origin of electricity.

Energy deviates from alignment → Space generates restorative pressure through tensor repulsion → This pressure gains directionality and manifests as electric output

[2] Redefinition of the Generation Mechanism

Conventional theory defines electricity generation as “electromotive force induced by a magnetic field crossing a conductor.”

However, under this theory, the process is reinterpreted as follows:

- Interaction with magnetic fields represents local breakdown in spatial tensor alignment
- The motion of the conductor is a deliberate stimulus to disrupt alignment
- As a result, space reacts with repulsion, generating electric energy (E) along the direction of restored alignment

This Process Can Be Diagrammed as Follows:

Aligned Structure (S) → Disturbance (ΔS) → Restorative Pressure (R) → Electric Output (E)

Where each symbol is defined as:

- S: Aligned spatial tensor structure
- ΔS : Disruption of alignment (directional deviation due to external stimulus)
- R: Restorative pressure from space attempting to re-align the structure
- E: Electrical energy (directional force output)

[3] Directionality and Polarity of Electricity

Electricity is defined here as a form of directional pressure, generated along a specific axis of alignment. The terms *positive (+)* and *negative (−)* poles are not fundamental physical entities, but rather denote the direction of alignment pressure in the tensor space.

- Positive pole (+): Starting point of alignment pressure; corresponds to *high energy density*

- Negative pole (−): Terminal point of alignment pressure; corresponds to *low energy density*

This view redefines electric current not as a flow of "charge"—an inherently vague concept—but as the flow of spatial alignment pressure.

[4] Unified Mathematical Model

Electric power generation within tensor-structured space can be formally expressed as:

$$E_{\text{power}} = R \times \Delta S \times C$$

Where:

- E_{power} : Generated electric power
- R : Spatial restorative coefficient (strength of re-alignment)
- ΔS : Degree of alignment disruption
- C : Responsiveness of the spatial structure (alignment sensitivity)

This equation demonstrates that electric power is not simply an amount of energy, but the result of a structured response to spatial misalignment.

[5] Application to Real-World Examples

- Hydroelectric Power: Water flow = structural stimulus → structural misalignment via turbine rotation (ΔS) → electromagnetic rotation induces restorative pressure → electricity generation.
- Solar Power: Structural vibration by light waves → alignment shift at PN junction (ΔS) → spatial reaction (R) → electron flow aligned with structure (E).
- Bioelectricity: Structural variation in membrane potential (ΔS) → spatial structure attempts repair → neural conduction voltage (E).

[6] Theoretical Positioning

This model of "Alignment Disruption → Rebound Pressure → Electric Output" forms a core component of the tensor-based spatial structure theory proposed herein. It enables all known power generation phenomena to be interpreted under a unified mechanical framework.

In this view, electrical energy is not the mere motion of particles or electrons, but a vectorial reaction of spatial alignment pressure—a response embedded within the very structure of space itself.

Section 5: Redefinition of Light and Electromagnetic Waves — As Structural Traces in Space

[1] Conventional Definitions and Their Limitations

In modern physics, light and electromagnetic waves are said to exhibit wave-particle duality: described as photons in quantum mechanics (particle behavior) and as electromagnetic waves in classical electrodynamics (field behavior).

However, this duality is largely a post hoc interpretation of experimental results and fails to describe the underlying structural changes of space. The following key aspects remain undefined:

- Why do they propagate as waves?
- Why do interference and diffraction occur?
- Why can they carry energy without mass?

[2] Redefinition in This Theory

In this framework, light and electromagnetic waves are defined as:

"Wave-like structural remnants of spatial tensor alignment deviations."

Rather than something "traveling through space", they are residual waveforms left by a collapse or deviation in the alignment of space itself.

Thus, we redefine:

- Photon: A structural trace emitted at the moment of alignment deviation
- Wavelength: The periodicity of spatial tensor alignment
- Velocity: The maximum transmission rate determined by the spatial alignment structure
- Amplitude: The degree of deviation from alignment

From this viewpoint, the detection of a photon as a particle is merely the moment when this structural trace collides or re-aligns with another tensor structure, resulting in reactivated energy output.

[3] Mathematical Model: Structural Definition of Trace Waves

The definition of light within the spatial tensor framework can be expressed as follows:

$$E_{\text{light}} = S_{\text{trace}} \times f \times C$$

Where:

- E_{light} : The energy carried by light
- S_{trace} : The strength of the residual trace left in the tensor structure (a remnant of structural collapse)

- f: Frequency of structural vibration (alignment periodicity)
- C: Spatial coherence coefficient (representing amplification or attenuation due to structural conformity)

This formula indicates that light emerges not as a transmitted entity but as a trace imprint in the structure of space.

Its particle-like appearance is merely the result of energy being reconstructed during realignment with other coherent structures.

[4] Phenomenological Application and Reframed Understanding

- Interference and Diffraction:
Arise from the tensor-based overlap of spatial structures causing alignment resonance.
- Polarization:
Caused by the directional matching between a trace wave and a spatial tensor alignment.
- Reflection and Refraction:
Result from reaction or directional shift at the boundary of coherent structures, depending on alignment.

From this perspective, all properties of light can be explained as reflections of alignment within spatial tensor structures, replacing the conventional idea of wave-particle duality with a structurally unified understanding.