

The Ultimate Direction of Human Civilization: Low Internal Friction, High Coherence, and Global Field Matching (With Verification and Prediction)

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Abstract

Based on the "universal phase-gradient field theory," this paper proposes a unified physical-philosophical framework, defining individual consciousness as a "consciousness standing wave" and social structure as a coupled "social field." Within this framework, civilizational internal friction is redefined as the systematic energy dissipation caused by frequency misalignment, phase conflict, and gradient antagonism at all levels of the consciousness field. The paper argues that through "neural standing wave purification" (enhancing individual internal coherence) and constructing "field matching" mechanisms (achieving precise adaptation in education, workplace, marriage, and social governance), internal and external friction can be systematically reduced. This theory finds cross-validation in neuroscience and social psychology. Guided by the generalized physical principle that "systems tend towards a low-dissipation steady state," it deduces an evolutionary path for civilization from tool foundation and social reshaping to paradigm shift, ultimately pointing towards a new civilizational steady state characterized by "low dissipation and high coherence"---a field-matching civilization.

Keywords: Internal friction, Coherence, Field matching, Consciousness standing wave, Civilizational evolution

1 Introduction: The Universality of Human Internal Friction and the Question of Its Essence

The evolution of human civilization has always been accompanied by a great paradox: while our ability to transform the external world grows exponentially, the "internal

friction" within human society and deep within the individual mind---that intangible, destructive energy dissipation---does not seem to diminish accordingly; in some dimensions, it even intensifies. Whether in the zero-sum games of international politics, efficiency friction within organizations, or the anxiety and internal struggle in the individual's mental world, this "internal friction" manifests as a systematic, emergent waste of energy. It hinders our transformation of known resources into substantive civilizational progress, becoming an invisible ceiling constraining development.

Traditional disciplines often dissect internal friction into independent problems in psychology (personal anxiety), sociology (structural conflict), economics (transaction costs), or political science (governance failure)^[1]. This fragmented perspective makes it difficult to discern their common underlying logic. This paper aims to propose a unified physical-philosophical framework---the "universal phase-gradient field theory"---attempting to reconceptualize consciousness, society, and their evolution from a more fundamental ontological level.

We model individual consciousness as a "consciousness standing wave" with specific frequency, phase, and gradient, while human society is seen as a "social field" formed by the complex coupling of countless such standing waves^[2]. In this paradigm, "internal friction" is no longer a vague metaphor but is strictly defined as: destructive interference caused by frequency mismatch, phase misalignment, or gradient antagonism within consciousness fields at all levels. This interference causes the system's ordered energy to transform into disordered thermal energy (entropy increase), i.e., ineffective dissipation.

Based on this definition of the physical essence, the core argument of this paper is: the fundamental direction of civilizational evolution lies in proactively intervening to enhance the system's coherence, i.e., evolving from a "high-internal-friction chaotic state" to a "low-internal-friction coherent state." This involves two synergistic levels: at the micro level, enhancing the individual's internal consistency through "neural

standing wave purification"; at the macro level, achieving precise adaptation and resonance between people and between people and systems by designing "field matching" mechanisms. We will argue that this is not a utopian fantasy but a civilizational engineering goal based on generalized physical principles (systems tending towards minimum dissipation) that can be progressively approximated^[3].

The following chapters will elaborate in turn: the physical mechanism of internal friction (interference and gradient), the dual-level evolutionary path (individual purification and social matching), testable evidence for this theory, and stage predictions for the future "field-matching civilization" based on current technological trends. We hope that through this attempt, we can provide a new perspective based on physical reality for understanding the human predicament and future path.

2 Theoretical Foundation: A Civilizational Internal Friction Model Based on Field Dynamics and Standing Wave Topology

2.1 Ontological Presuppositions: From the universal phase-gradient field theory Field to Consciousness Standing Waves

This theory takes the "universal phase-gradient field theory" as its premise. The theory posits that the origin of the universe is an omnidirectional topological field resonating with zero-point energy across all frequency bands. Living organisms, especially conscious subjects, are modeled as a stable dynamic closed loop sustained within this field through resonance locking, phase synchronization, and energy binding---a "consciousness standing wave"^[4]. Its "mass" corresponds to the total energy density and topological stability of the standing wave. The interaction of multiple consciousness standing waves constitutes a higher-order "social field."



Figure 1. Individual Consciousness Standing Wave and Internal Friction

Figure 1. Schematic of the individual consciousness standing wave model. (A) A stable standing wave with strong phase locking and low noise, corresponding to high purity Si and minimal self-internal friction. (B) A disordered standing wave with phase detuning and noise interference, corresponding to low purity and high internal friction.

2.2 Core Dynamic Principle: Gradient-Driven Low-Dissipation Evolution

Within this framework, "internal friction" is physically defined as energy dissipation caused by field matching failure, manifested as internal interference, mutual interference, and gradient antagonism. System evolution is governed by the "Principle of Minimum Internal Friction": coupled systems composed of consciousness standing waves have a statistical tendency to spontaneously evolve towards states with lower overall internal friction (total destructive interference energy) in the long term^[5].

2.3 Core Quantitative Relationships

To translate the theoretical framework into a testable scientific model, we propose the following three core quantitative relationships, aimed at providing a mathematical prototype for describing "internal friction" and "matching" from the micro to the macro level.

(1) The Physical Definition of Internal Friction (Dissipation)

The total internal friction D of a system can be expressed as a function of the degree of frequency and phase mismatch between all individual consciousness standing waves:

$$D = \sum_{i < j} |\Delta f_{ij}| \cdot |\Delta \phi_{ij}|$$

Here, Δf_{ik} is the inherent frequency difference between any two consciousness standing waves i and j , corresponding to the fundamental differences in their deep structures (e.g., core values, cognitive patterns). $\Delta \phi_{ij}$ is their instantaneous phase difference at a specific moment, corresponding to the misalignment of immediate emotions, intentions, or stances. Internal friction D is the sum of the products of these two key dimensions of mismatch. It physically describes the total energy dissipated within the system due to destructive "field mismatch" interference.

(2) Stability (Purity) of the Individual Standing Wave

The stability and introspective purity S_i of an individual consciousness standing wave can be defined by its internal energy distribution:

$$S_i = \frac{\text{Energy Density of the Dominant Frequency}}{\text{Energy Density of Noise Waves}}$$

This equation measures the focus of an individual's "neural standing wave." The numerator represents the neural oscillatory energy aligned with the individual's core goals, identity, or deep intentions. The denominator represents the chaotic oscillatory energy caused by distraction, internal conflict, or irrelevant stimuli. A higher S_i value indicates weaker internal interference, greater energy concentration, and lower "self-internal friction" for the individual. Enhancing S_i through training (e.g., meditation, focused attention) is the quantitative objective of the "standing wave purification" process^[6].

(3) Overall Coherence of the Social Field

The overall coherence and operational "smoothness" C of a social system (such as a team, organization, or community) can be described as:

$$C = \frac{1}{N} \sum_{i < j} \cos(\Delta\phi_{ij})$$

Here, N is the total number of individual pairs in the system. Coherence C is essentially the average of the cosine values of the phase differences between all individual pairs. When all individuals are in perfect phase synchronization ($\Delta\phi_{ij} = 0$), $C=1$, the system is in a state of complete coherence, with maximum energy superposition efficiency and internal friction approaching zero. When phases are completely opposite ($\Delta\phi_{ij} = \pi$), $C = -1$, the system is in a state of maximum destructive interference, with extremely high internal friction. Coherence C is the core optimization metric for social "field matching" engineering^[7].

These three formulas constitute a coherent quantitative perspective from "individual internal friction ($1/S_i$)" to "interaction friction ($|\Delta f| |\Delta\phi|$)" to "system efficacy (C)", preliminarily anchoring the philosophical conception of the "universal phase-gradient field theory Field" into a computable, optimizable physical model.



Figure 2. Social Field Coherence and Internal Friction

Figure 2. Social field coherence and internal friction. (A) High coherence state ($C \approx 1$) with aligned phases and low dissipation. (B) Low coherence state with random phases and high destructive interference (high internal friction D).

3 Verification and Prediction: Empirical Anchors and Evolutionary Landscape of the Field Matching Theory

This chapter examines the Field Matching Theory within the flow of time, arguing that it possesses not only logical consistency but also powerful retrospective explanatory power and prospective predictive capability. This constitutes a key step for the theory moving from a "philosophical construct" towards a "scientific theory."

3.1 Retrospective Verification: Field Dynamics as a Diagnostic for Civilizational Pathology

The theory provides a set of "field diagnostics" for understanding history.

3.1.1 Field Characteristics of High-Coherence Civilizational Steady States

Historical "Golden Ages" (e.g., the Kaiyuan Era of Tang Dynasty, the Italian Renaissance) were not accidental. From a field perspective, their common feature was a social field with a relatively concentrated frequency spectrum (strong mainstream cultural consensus) and a gentle phase gradient (high social mobility, mitigated contradictions), thereby maintaining a high level of social coherence C . Civilizational energy was thus efficiently directed towards external creation, not internal dissipation.

3.1.2 Interference Dynamics of Civilizational Collapse

The collapse of civilizations (e.g., the Western Roman Empire) can be diagnosed as a violent, systematic "field detuning"^[8]. The process typically involves: 1) The introduction of new ideologies or external shocks causing a sharp increase in heterogeneous frequencies (Δf); 2) The rigidity of old structures failing to effectively absorb and harmonize, leading to a continuous widening of the phase difference ($\Delta\phi$); 3) When the internal friction $D = \Sigma|\Delta f| \cdot |\Delta\phi|$ exceeds the system's bearing threshold, the coherent structure disintegrates, and the system falls into a high-internal-friction chaotic state. This explains why crises often stem from "failed transformation" rather than mere resource scarcity.

3.1.3 Field-Theoretic Interpretation of Organizational Life

The rise and fall of enterprises also follow the logic of field matching. Successful companies (e.g., Apple in the early iPhone era) construct a powerful internal "resonance cavity," where employees are frequency-locked with the vision and their actions are phase-synchronized. Their decline often begins with innovation stagnation (frequency solidification) or cultural fragmentation (phase unlocking), leading to increased internal friction and a dull response to external changes.

3.2 Reinterpretation of Contemporary Scientific Evidence through the Field Lens

Existing scientific discoveries serve as annotations for the micro-mechanisms of this theory.

3.2.1 Neural Coherence and Consciousness Purity

The enhanced gamma-wave synchrony observed in the brains of meditators is precisely the neural correlate of increased individual stability S_i ^[9]. This provides direct physiological evidence for "neural standing wave purification."

3.2.2 Interpersonal Synchrony as a Micro-Manifestation of Field Matching

Hyperscanning technology reveals that increased synchronization of brain activity between parties during successful conversation or cooperation is direct proof of a reduction and tendency towards locking of the dual-body field phase difference ($\Delta\phi$)^[10,11]. Similarly, emotional contagion is the resonant propagation of emotional field phases.

3.2.3 Phase Transitions and Criticality in Social Systems

Sudden shifts in public opinion and financial market crashes are viewed as "phase transitions" in complex systems science^[12,13]. From the field perspective, these are precisely the catastrophic transitions in social coherence C after key parameters (e.g., consensus degree-frequency, dissatisfaction-phase) cross a critical point. This theory provides a physical explanation based on interference mechanisms.

3.3 Future Evolution: Civilizational Dynamics Predictions Based on Field

Principles

The true power of a theory lies in foresight. The following is a testable evolutionary landscape based on field dynamics principles.

3.3.1 The Measurement Revolution: The Manifestation of Consciousness Fields (Next 10-30 Years)

Prediction 1 (Individual Field Mapping): Neural field imaging technology will, for the first time, allow the objective mapping of the "frequency spectrum" and instantaneous "phase" of individual consciousness standing waves. Stability S_i will become a reportable physiological metric, guiding personalized education and psychological training.

Prediction 2 (Social Field Perception): Real-time "social emotional field" maps based on multimodal big data will become possible. Social coherence C and stress gradient ∇ will become leading indicators of social health, warning of systemic risks^[14].

3.3.2 The Matching Revolution: A Paradigm Shift in Social Engineering (Next 30-100 Years)

Prediction 3 (Establishment of the Precision Matching Paradigm): In education, career development, and deep social interaction, matching algorithms based on field parameter compatibility will surpass shallow matching based on tags and resumes, becoming mainstream^[15]. Their core objective is to maximize constructive interference in local fields, not simple filtering.

Prediction 4 (Adaptive Social Governance): Social governance will shift from a static "design-execute" mode to a dynamic "sense-tune" mode. Policies will become real-time "feedback control signals" for the social field, aimed at suppressing harmful gradients and guiding the system towards higher coherence states^[16].

3.3.3 Paradigm Leap: The Emergence of a Low-Dissipation Civilization (Beyond 100 Years)

Prediction 5 (Internal Friction as a Core Civilizational Metric): The "Net Social Internal Friction Rate" will replace, or at least stand alongside, GDP as a fundamental indicator of civilizational development. The focus of civilizational competition will shift from the extensive possession of energy and matter to the exquisite organization of information and consciousness fields.

Prediction 6 (Field Fusion for Collective Intelligence): When individual purification and global matching reach an extremely high degree, through secure field interfaces, humans may achieve temporary, high-trust coherent superposition of consciousness fields, forming "super-individual intelligence" to solve super-problems^[17,18]. This marks the transition of civilization from a "collection of individuals" to a truly coherent whole with a higher-level consciousness.

3.4 Boundaries, Challenges, and Openness of the Theory

This theory is one physics-philosophy-based simplified model of the complexity of consciousness and society, not the sole truth^[19]. It currently focuses on the core dichotomy of "interference" vs. "coherence." More complex nonlinear effects, creativity at the edge of chaos, and the place of "free will" within deterministic equations are profound challenges the theory must address and deepen^[20]. We present

it as an open framework for evolution, to be enriched by future science and philosophy.

4 The Physical Roots of Human Internal Friction: Multi-Level Manifestations of Field Mismatch

4.1 Individual Level

Anxiety, indecisiveness, and other forms of "self-internal friction" correspond to frequency detuning and phase interference within a single consciousness standing wave caused by the introduction of heterogeneous "noise waves," manifesting as low coherence in neural activity^[21].

4.2 Interpersonal Level

Conflicts and misunderstandings arise from frequency misalignment and phase conflict between different consciousness standing waves^[22]. In-phase opposition leads to destructive interference, while gradient differences create relational "shear forces."

4.3 Social and Civilizational Level

Systemic inefficiencies such as bureaucracy and cultural conflicts stem from coupling disorder, field structure distortion, and feedback delays that occur when large numbers of consciousness standing waves are connected through "coupling media" like institutions and culture, leading to low energy conversion efficiency in the macroscopic field^[23].

5 The Dual-Level Path of Human Evolution: From Standing Wave Purification to Global Field Matching

5.1 Individual Evolution: Purification and Harmonic Frequency of Neural Standing Waves

The core goal is to enhance the individual's internal coherence. Methods include: Consciousness self-reference and awareness (establishing a "meta-position" to observe internal interference) and Neural field calibration training (suppressing noise

waves and reinforcing phase locking of the main frequency through focus, emotional regulation, and value integration)^{[24],[25]}.

5.2 Social Evolution: Precise Coupling and Synergy of Group Fields

The core goal is to design field matching mechanisms that maximize constructive interference. The method is to apply the principle of field matching in core social scenarios^[26]:

Education: Early identification of the dominant frequency of an individual's neural standing wave, providing personalized resonance to optimize the neural standing wave pattern.

Workplace: Parsing positions into required "field characteristics," achieving person-position frequency matching and team phase management to maximize the coherence of the group task field.

Marriage and Relationships: Assessing deep frequency compatibility, establishing dynamic phase calibration mechanisms to construct a highly stable dual-body resonance closed loop^[27,28].

Social Governance: Establishing a real-time social field state sensing system, based on data for precise tuning and suppression of social emotions and conflict gradients, achieving low-dissipation regulation of large-scale group fields^[29,30].

Individual purification and social field matching constitute the synergistic double helix of civilizational evolution.



Figure 3. Evolution Path of Civilization: Purification and Field Matching

Figure 3. Dual-level evolutionary path of human civilization. Left: individual standing wave purification (increasing S_i). Right: social field matching (increasing coherence C), covering education, workplace, marriage, and governance.

6 Conclusion: Towards a New Civilizational Steady State Based on Physical Reality

This paper has demonstrated the physical essence of human civilizational internal friction and its inevitable direction of evolution. The Field Matching Theory indicates that civilization's evolution towards a state of "low internal friction and high coherence" is not merely a moral vision but a process with internal necessity, guided by the generalized physical principle that "systems tend towards a low-dissipation steady state." By embracing this perspective based on physical reality and embarking on exploration along the dual paths of individual purification and social matching, humanity may perhaps transcend historical disputes and find a solid common foundation for building a future civilization with less suffering, greater creativity, and sustainability. This is the new blueprint based on reason and empiricism that the Field Matching Theory outlines for the ultimate direction of human civilization.

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1. Funding Declaration: The authors declare that no funds, grants, or other support were received for this research.

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