

Collapse-Repulsion Binary Field Gravity Hypothesis

Cheng Pan

Email: 42133299@qq.com

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Abstract

This physical-mechanism hypothesis retains all existing mathematical formulas, calculation rules and experimental data of classical and celestial mechanics without changing any quantitative results, and only reconstructs underlying physical interpretation. It abandons Newtonian attractive gravity and intrinsic spacetime curvature from general relativity, and attributes all macroscopic gravitational and orbital behaviors to layered field effects originating from dynamic balance between intrinsic collapse potential and repulsive curvature of cosmic energy. The theory constructs three-layer spatial field structure around celestial bodies, naturally explains flat galactic rotation curves without dark matter assumption, and extends the identical core mechanism to microscopic scale to unify quark confinement and asymptotic freedom. A testable prediction on satellite orbital decay is put forward for experimental verification.

Keywords: Collapse Potential; Repulsive Curvature; Binary Field Gravity; Three-Layer Field Structure; Galactic Rotation; Quark Confinement; Orbital Decay Prediction

1 Preliminary Core Statements

1.1 Mechanism Restatement Principle

This innovative hypothesis reformulates physical explanations while fully reserving all mathematical frameworks and measured data of classical mechanics and astrophysics; no computed numerical outcome is modified.

1.2 Consistency with Observation

Mathematical calculation systems remain unchanged, only the inner physical mechanism is redefined. All derivations are built on objective astronomical and laboratory observations without arbitrary hypothetical settings conflicting with real measurements.

1.3 Core Theoretical Correction

There exists no inherent Newtonian gravitational pull nor fundamental spacetime curvature proposed by general relativity. All macroscopic binding effects and orbital motions arise from stratified equilibrium fields formed by dual competing energy properties of celestial objects.

2 Single Fundamental Axiom

Fundamental cosmic energy has two inherent, opposite and coexisting properties universally valid for both cosmic-scale objects and elementary particles. All physical phenomena at macro and micro scales stem from dynamic competition between the two properties, free from metaphysics, circular reasoning or extra auxiliary hypotheses.

2.1 Condensation Property (Collapse Potential)

Energy converges inward and accumulates continuously to form condensed material entities together with spatial confinement effects. It accounts for surface gravity, matter aggregation, strong high-altitude confinement, quark confinement and field energy conversion.

2.2 Diffusion Property (Repulsive Curvature)

Energy expands outward and disperses to generate spatial repulsion and curved orbital sliding effects, responsible for space weightlessness, planetary revolution, atmospheric stratification and short-range free motion of fundamental particles.

Core Rule: The surrounding space of any energy condensate shifts sequentially from collapse-dominated, dual competing equilibrium to repulsion-dominated with growing distance, forming natural layered balance configuration universally applicable across all scales.

Inverse Proportional Law: Collapse force and repulsive force restrain each other inversely; field working intensity is inversely proportional to distance, serving as the core governing law for galaxies, celestial bodies and particles.

3 Three-Layer Spatial Field Structure of Celestial Bodies

Space surrounding a celestial body divides into three continuous layers without sharp geometric boundaries, featuring gradual transition and critical interface mutation consistent with observational features. All classical formulas are inherited entirely with revised physical meaning only.

3.1 Inner Layer: Pure Collapse Field (Collapse Dominated)

Covers ground surface to low altitude: near-surface free collapse and high-altitude confined collapse. Higher altitude corresponds to stronger intrinsic collapse potential and enhanced inward energy flow; near ground energy inflow nearly stagnates enabling free object movement.

$$G = mg$$

Equivalent weight reflects proportional coupling between object mass and terrestrial collapse field.

$$g = \frac{GM}{r^2}$$

Apparent gravitational acceleration; physically larger r means stronger intrinsic confinement while external objects only sense field gradient reduction.

$$E_p = -\frac{GMm}{r}$$

Field potential energy increases with altitude due to enhanced inward energy storage, converting into kinetic energy during free fall.

Core Mechanism Supplement: The core logic of this field achieves closed-loop self-consistency through the "field-source integration and external coupling dichotomy": thus forming the bidirectional objective law that "intrinsic field strength increases with altitude while apparent force decreases with altitude", without any logical contradiction.

3.2 Middle Layer: Collapse-Repulsion Membrane Layer

A finite-thickness dynamic transition zone where collapse potential and repulsive curvature interpenetrate and compete continuously.

1. Gradient shift from collapse dominance through equal balance to repulsion dominance along vertical direction;
2. Intense field competition accumulates atmospheric and ionospheric particles and causes natural stratification of atmosphere, ionosphere and radiation belts. Mainstream explanations such as atmospheric drag, solar wind and geological structure are secondary auxiliary factors; multiple theories coexist without conflict, and this theory provides a more fundamental unified mechanism;
3. Sharp gravity drop occurs when crossing critical boundary and switching field dominant mechanism abruptly.

$$F_D = \frac{1}{2}\rho v^2 C_D S$$

The formula calculates atmospheric drag; residual irregular orbital damping originates from secondary binary field effects.

3.3 Outer Layer: Pure Repulsive Curvature Field (Repulsion Dominated)

Free from collapse confinement; energy diffusion property dominates spatial form, forming repulsive curvature spacetime. Core law: No downward binding effect in the field, objects glide freely along curvature trajectories and present complete weightlessness; the higher the altitude, the more significant the repulsive field check-and-balance effect, and the weaker the celestial body binding influence.

$$F_n = m\frac{v^2}{r}$$

Apparent centripetal constraint from curved repulsive field.

$$v = \sqrt{\frac{GM}{r}}$$

Critical stable orbital speed determined by inertia and curvature field intensity.

4 Key Qualitative Deductions

1. Thickness of collapse-repulsion membrane positively correlates with celestial mass and density, matching compact stars such as white dwarfs and neutron stars;
2. Intrinsic collapse field strength rises with height leading to higher stored potential energy, consistently explaining high-altitude large kinetic energy after falling. Through the internal-external field dichotomy logic, it completely distinguishes intrinsic field strength from apparent force, eliminates the ambiguous mechanism problem in classical physics, with no logical conflict or forced fitting;
3. Sharp weightlessness emerges once crossing into outer repulsive curvature field;
4. Layered dual-energy competition fundamentally creates planetary atmospheric and radiation belt stratification;
5. At galactic center, intense collapse stagnates inner stellar motion; peripheral weakened collapse plus enhanced repulsion accelerates outer stars, matching observed flat galactic rotation curves without dark matter.

5 Resolution of Traditional Physical Paradoxes

1. Explains contradictory classical potential energy definition via altitude-dependent inward energy flow;
2. Eliminates paradox of smooth gravity decay conflicting with rising falling kinetic energy and abrupt orbital weightlessness;
3. Unifies gravity and orbital dynamics under identical dual-field mechanism, breaking the conceptual fragmentation of mainstream theories that claim "gravity is not a force" but cannot reconstruct the underlying mechanism of gravity phenomena;
4. Accounts for tiny deep-space orbital decay independent of atmospheric resistance;
5. Avoids inappropriate cross-scale analogy between macroscopic gravity and quantum behavior, clearly distinguishes the boundary differences between macroscopic celestial binary field system and quantum field system;
6. Provides self-consistent physical interpretation for abnormal galactic rotation without hypothetical invisible matter.

6 Unique Falsifiable Prediction

Under identical orbit height, geometry, frontal area and ambient environment: satellites made of higher-density material couple more strongly with terrestrial collapse field and experience faster orbital decay, whereas low-density loose-structured satellites decay more slowly. This prediction can be verified using published historical on-orbit satellite data.

7 Microscopic Isomorphic Mechanism for Fundamental Particles

This chapter is an endogenous global extension of the theoretical system, introducing no new axioms or ad hoc assumptions. It fully inherits the core mechanisms of "dual energy properties, inward flow work, and field-source internal-external dichotomy", realizing the global unification of macroscopic celestial fields and microscopic particle fields, and completely solving the core problem of macro-micro mechanism fragmentation in physics.

7.1 Fundamental Premise

Quark and gluon systems are ultra-dense condensed energy fields isomorphic to stellar collapse fields. QCD only summarizes experimental phenomena of quark confinement and asymptotic freedom lacking underlying physical interpretation.

7.2 Micro-Macro Corresponding Rules

1. **Quark Confinement:** Longer inter-quark distance strengthens intrinsic collapse potential and binds quarks tightly, analogous to strong high-altitude confinement on celestial scale;
2. **Asymptotic Freedom:** Extremely short quark separation stagnates inner energy flow and drastically weakens binding, equivalent to free motion near planetary surface.

7.3 Internal-External Dichotomy Logic for Microscopic Fields

Microscopic particle systems also follow the core dichotomy rule of this theory, completely distinguishing intrinsic field strength from apparent force: inside the microscopic integrated field, the farther the distance, the stronger the confinement and the greater the work capacity; if an external independent particle couples to the microscopic field, it can only perceive the field gradient, presenting apparent phenomena different from the internal intrinsic law. This logic thoroughly explains the particularity of quantum field phenomena while ensuring global mechanism unification, eliminating the need for separate physical rules for microscopic systems.

7.4 Global Unification Core Conclusion

Macroscopic celestial gravity phenomena, orbital field effects, microscopic quark confinement and asymptotic freedom are not two independent sets of physical rules, but differential manifestations of the same set of dual energy contraction-repulsion game and the same inward energy flow work mechanism at different energy condensation scales. Through endogenous global extension, this theory completely breaks down the mechanism barrier between classical physics and quantum physics, formally forming a prototype of a minimal, self-consistent, contradiction-free and fully covered global unified field theory.

8 Overall Theoretical Evaluation

1. The entire framework is built merely upon condensation and diffusion properties of energy with universal scale-free axioms;
2. Realizes unification of macroscopic gravity and microscopic quantum chromodynamics;
3. Fully compatible with all validated classical, relativistic and quantum experimental results without altering computational formulas;
4. Satisfies standard physical hypothesis criteria: clear axioms, self-consistent logic, observation-based derivation and explicit experimental falsification.

9 Final Objective Positioning

1. Meets the admission criteria for standard physical hypotheses: clear underlying axioms, completely self-consistent logic, based on objective observational phenomena, with clear falsifiable predictions, free from metaphysics, circular reasoning and logical contradictions;
2. Core innovative value: Abandons wrong cross-scale theoretical analogies, establishes an exclusive binary contraction-repulsion field theory for macroscopic celestial bodies, opens up macro-micro energy condensation logic, and uses a single dual energy property to uniformly explain surface gravity phenomena, high-altitude field effects, cliff-type gravity drops, orbital operation and decay, celestial interaction, and large-scale galactic motion laws, completely making up for the mechanism fragmentation loopholes of classical physics and relativity; all engineering calculations are fully compatible, and theoretical unification is achieved only through physical narrative reconstruction.

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