**Cosmic Sign Symmetry: Unified Emergence of Matter, Dark Matter, and Gravity from ABC Vortex Fields**  
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**Abstract:** Based on the coupling mechanism of three fundamental cosmic vortex fields—the electromagnetic vortex field (A-field), color-charge vortex field (B-field), and Higgs vortex field (C-field)—this paper constructs a complete sign-symmetric cosmological model. We demonstrate that: the dichotomy between matter and dark matter originates from the spontaneous breaking of sign symmetry in the C-field vacuum expectation value ⟨ǫ⟩; their electromagnetic interaction separation arises from the A-field differentiating into a ƫظ± dual structure under this breaking; while gravity, which connects everything, stems from the tensor excitation state (graviton) of the C-field itself. Ultimately, the microscopic repulsive force mediated by charges (endowed by the B-field) between matter and dark matter particles precisely emerges as Newtonian universal gravitation under the mean-field approximation of a negative-mass background. This model achieves a unified derivation of all material forms and fundamental forces from three primordial fields.  
**Keywords:** ABC mechanism; sign symmetry; vacuum breaking; vortex field; emergent gravity; unified theory  
 1. Introduction: All Things Originate from Fields  
Li Zhijun’s ABC theory posits that all things are not “composed” of particles, but rather emerge from field vortices excited by cosmic energy quanta and their topological combinations. All particle properties—wave nature (A), charge (B), mass (C)—originate from their specific coupling modes with these three fundamental fields. This paper aims to answer: How can both our familiar material world and the mysterious dark matter world simultaneously emerge from these three fields?  
 2. Theoretical Foundation: ABC Vortex Fields and Their Sign Symmetry  
We define three fundamental fields on the 26-dimensional spacetime ℳ²⁶:  
**2.1. A-field (Electromagnetic Vortex Field):** ǩظ  
Responsible for wave nature and phase interference, its excitations determine the wavefunction behavior of particles.  
**2.2. B-field (Color-Charge Vortex Field):** Ǫظǅ  
Responsible for electric and color charges, its topological branch coupling determines charge quantization and fractionalization.  
**2.3. C-field (Higgs Vortex Field):** ǫ  
Responsible for mass and inertia, the sign of its vacuum expectation value ⟨ǫ⟩ determines positive or negative mass.  
The complete action includes kinetic and topological coupling terms:

The topological term is the root of particle spectrum differentiation.  
 3. Spontaneous Breaking of Sign Symmetry and Field Differentiation  
**3.1 C-field Breaking and Mass Sign Differentiation**  
The potential of the C-field permits two degenerate vacua:  
- Positive vacuum :   
- Negative vacuum :   
During cosmic cooling, the universe spontaneously selects one of these vacua. Due to quantum fluctuations, both selections can occur in different spacetime regions. This leads to:  
- Field combinations coupled to acquire positive mass, becoming matter particles.  
- Field combinations coupled to acquire negative mass, becoming dark matter particles.  
**3.2 A-field Differentiation: From ǩ to ƫظ±**  
The critical step is that the behavior of the A-field is modulated by the C-field vacuum expectation value. In the action , the topological coupling term causes sign changes in the effective kinetic term of the A-field when the C-field takes different vacuum values.  
In the low-energy effective theory, the A-field splits into two independent components:

They couple to particles in positive/negative vacuum regions respectively and acquire distinct effective mass terms:

Thus, in 4D spacetime, they manifest as positive-mass photons and negative-mass photons .  
**3.3 Role of the B-field: Charge Endower**  
The B-field itself does not participate in sign symmetry breaking. It provides the source of charge for all particles through its color-charge branches (red, green, blue, etc.). A particle’s charge is determined by the topological coupling strength between its field combination and a specific branch of the B-field:

Regardless of whether a particle couples to or , its charge value is identical if its B-field combination mode is the same. This explains why dark matter can carry charge.  
 4. Unified Emergence of Forces  
**4.1 Separation of Electromagnetic Force**  
Since the A-field has differentiated into and , and matter fields couple selectively:  
- Positive-mass matter fields couple only to , interacting electromagnetically via exchange.  
- Negative-mass dark matter fields couple only to , interacting via exchange internally.  
No mixing terms exist between and . Electromagnetic interaction is strictly confined within each mass category.  
**4.2 Unification and Origin of Gravity**  
Gravity is the only force not split by sign breaking. It originates from the tensor excitation of the C-field itself:

The graviton has strictly zero mass. Its coupling depends only on the coupling strength , not on the sign of the C-field vacuum expectation value. Thus, gravitons couple equally to all matter and dark matter, serving as the sole bridge connecting the two worlds.  
**4.3 Microscopic Realization of Apparent Gravity**  
A matter particle carrying charge and a dark matter particle carrying charge experience a microscopic Coulomb repulsion:

In a universe filled with a uniform soup of negative-mass dark matter particles (number density , mass ), the macroscopic average force on a matter particle is:

This precisely matches the form of Newton’s law of universal gravitation, where the effective gravitational constant emerges as:

5. Conclusion: From Trinity to Universal Symbiosis  
Starting from the three fundamental ABC vortex fields, this paper reveals the sign symmetry of the cosmos and its breaking mechanism:  
**5.1. Monistic Origin:** All things originate from the coupling of cosmic energy quanta with the three fundamental vortex fields A, B, and C.  
**5.2. Dichotomous Realms:** Vacuum sign breaking of the C-field leads to the dichotomy between matter (positive mass) and dark matter (negative mass).  
**5.3. Threefold Path of Forces:**  
- A-field differentiation isolates the dominant electromagnetic force by mass sign.  
- B-field invariance provides the charge source for all particles.  
- C-field self-excitation generates gravity, becoming the universal force connecting everything.  
**5.4. Gravitational Illusion:** Microscopic electromagnetic repulsion magically emerges as apparent gravitational attraction at macroscopic scales.  
This theory ultimately attributes the three fundamental particle properties—wave nature (A), charge (B), mass (C)—along with the matter/dark matter dichotomy and the separation/unification of forces, perfectly to the distinct coupling modes of the three primordial fields. It achieves an extremely concise and unified description of the cosmic picture.  
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