**The Ultimate Architecture of the Universe: A Unified Model of Symbolic Symmetry Cosmology Based on ABC Vortex Fields**  
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**Abstract:**  
This paper proposes an ultimate unified model based on three fundamental cosmic vortex fields—the electromagnetic vortex field (A-field), color charge vortex field (B-field), and Higgs vortex field (C-field). We demonstrate that the previously proposed symbolic symmetry electromagnetic theory and gravitational interactions are emergent phenomena of the ABC fields at low energies. Specifically: The gauge fields arise from topological couplings between the A-field and specific branches of the B-field; the massless graviton manifests as a tensor excitation mode of the C-field. Both matter and dark matter originate from couplings between cosmic energy quanta and specific combinations of ABC fields, with their mass signs determined by the vacuum branch () of the C-field coupling. This model not only achieves a unified description of matter, dark matter, and the four fundamental forces but also reveals the microscopic origins of apparent gravitational and electromagnetic interactions from first principles, constructing a fully self-consistent cosmological framework.  
**Keywords:** ABC mechanism; Vortex fields; Symbolic symmetry; Emergent gauge fields; Apparent gravity; Unified model  
 1. Introduction: Toward Ultimate Unification  
Previous research established a cosmological model with symbolic symmetry, yet the origins of gauge fields and the graviton remained hypothetical. This paper returns to the cornerstone of Professor Li Zhijun’s theory—the three fundamental cosmic vortex fields ()—aiming to demonstrate that all interactions and material forms emerge from these fields and their couplings.  
 2. Theoretical Foundation: ABC Vortex Fields and Their Couplings  
#### 2.1 Field Definitions and Higher-Dimensional Action  
In 26-dimensional spacetime , the action for ABC fields is defined:

where:  
- (A-field kinetic term)  
- (B-field kinetic term)  
- (C-field kinetic and self-interaction terms)  
- (Topological coupling terms)  
 2.2 Mass Sign Differentiation and Vacuum Selection  
The C-field potential permits two degenerate vacua:  
- **Positive-mass vacuum** :   
- **Negative-mass vacuum** :   
The mass sign of a particle state depends on which vacuum its C-field component couples to:

3. Emergence Mechanisms of Interactions  
3.1 Emergence of Electromagnetic Interaction (Cooperation of A- and B-Fields)  
The gauge fields are not fundamental but emerge from topological couplings between the A-field and specific branches of the B-field:

where is a projection operator extracting specific color-charge branch combinations from the B-field. This coupling implies:  
- : Excitation of , corresponding to a specific coupling mode between the A-field and positive color-charge () branches of the B-field.  
- : Excitation of , corresponding to a specific coupling mode between the A-field and anti-color-charge () branches of the B-field.  
Due to topological differences between the B-field’s positive and anti-branches, the propagators of and exhibit fundamental distinctions (poles at vs. ), manifesting as two non-mixing fields at low energies.  
 3.2 Emergence of Gravity (Excitation of the C-Field)  
The graviton is a tensor excitation state of the Higgs field :

As it originates from the intrinsic dynamics of the C-field—which provides mass to both vacua—the graviton naturally couples to all matter regardless of mass sign. Its masslessness is guaranteed by the gauge symmetry of the C-field.  
 4. Complete Cosmological Picture: A Symbolic Symmetry Universe Dominated by ABC Fields  
Based on ABC field theory, we outline the ultimate cosmic landscape:  
 4.1 Birth of Matter  
Cosmic energy quanta couple to ABC fields, with their field combination modes determining whether particles are matter or dark matter:  
- **Matter particles** (): (coupled to )  
- **Dark matter particles** (): (coupled to )  
 4.2 Laws of Forces  
- **Electromagnetic Force**: Mediated jointly by A- and B-fields. Matter and dark matter, coupling to different branches of the B-field, interact exclusively with corresponding , rendering them electromagnetically invisible to each other.  
- **Gravity**: Mediated by the C-field. As the source of mass, it acts universally on all matter, serving as the sole bridge between the two worlds.  
 4.3 Microscopic Mechanism of Gravity  
The repulsive Coulomb force experienced by a matter particle from a dark matter background is macroscopically equivalent to Newtonian gravity . The gravitational constant emerges from dark sector parameters:

(: dark matter coupling constant; : dark matter number density)  
 5. Conclusion: From Vortex Fields to the Universe  
This paper achieves ultimate theoretical unification:  
5.1. **All from Fields**: All matter and forces trace back to the dynamics and topological couplings of the electromagnetic vortex field (), color charge vortex field (), and Higgs vortex field ().  
5.2. **Symmetry Governance**: The symmetry between matter and dark matter originates from the dual vacuum structure of the C-field and the positive/anti-color-charge branch symmetry of the B-field.  
5.3. **Force Differentiation**: Electromagnetic force separation arises from coupling differentiation (A-field coupling to distinct B-field branches); gravitational universality stems from its unique origin (C-field).  
5.4. **Essence of Gravity**: Universal gravitation is a macroscopically emergent equivalent phenomenon. Its microscopic essence is the statistical average of repulsive forces exerted by diffuse negative-mass dark matter on positive-mass matter.  
This model situates particle physics and cosmology within a single, self-consistent mathematical framework, offering a potential path toward exploring the ultimate mysteries of the universe.  
 References  
[1] Li, Z. J. (2023). *The ABC Mechanism in the Universe*.  
[2] Wen, X. G. (2004). *Quantum Field Theory of Many-Body Systems*. Oxford University Press. (On emergent gauge fields)  
[3] Seiberg, N., & Witten, E. (1994). Electric-magnetic duality, monopole condensation, and confinement in supersymmetric Yang-Mills theory. *Nucl. Phys. B*. (On duality and emergence)  
[4] Verlinde, E. P. (2011). On the Origin of Gravity and the Laws of Newton. *JHEP*. (On emergent gravity)