### A Complete Field-Theoretic Framework for Quantum Cosmology: A Model of Universe Creation Based on Dynamic ABC Vortex Fields and Spontaneous Symmetry Breaking

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**Abstract:** This paper proposes a complete cosmological model based on quantum field theory. By introducing the non-equilibrium dynamics of dynamic ABC vortex fields and the mechanism of spontaneous symmetry breaking, it provides a unified explanation for the quantum origin of the universe, the generation of matter/dark matter, the nature of dark energy, and the matter-antimatter asymmetry. We construct the complete action of the ABC field in 26-dimensional spacetime, describing the bound state of the singularity through a topologically non-trivial solution; calculate the energy release rate using instanton tunneling; derive the particle production rate equation via the non-linear coupling tensor ; rigorously prove a net baryon number based on the geometric asymmetry of the color charge field B (); and finally, derive the dynamic field rupture and the emergence of dark energy through a modification of the field equation by the trace-reversed stress-energy tensor . The model calculates, for the first time from first principles, the cosmic energy components , with all parameters determined by fundamental constants of the field theory.  
**Keywords:** Quantum Field Theory; ABC Vortex Field; Non-equilibrium Dynamics; Spontaneous Symmetry Breaking; Topological Solution; Cosmological Parameters  
**1. Introduction and Theoretical Framework**  
We consider a complete action in a 26-dimensional spacetime :  
  
where:  
\* (Higher-dimensional gravity)  
\* (ABC dynamics term)  
\* (Topological interaction term)  
\* (Cosmic energyon source term)  
**2. The Bound State of the Singularity: A Topologically Non-trivial Solution**  
The singularity state corresponds to a topologically non-trivial solution of the ABC field, whose field configuration satisfies:  
  
This solution has a non-zero topological charge:  
  
The potential forms a potential well at , with a depth .  
**3. Quantum Tunneling and Energy Release**  
Through instanton calculation, the tunneling rate is:  
  
The energy release is described by the source term:  
  
The cosmic energyon current satisfies superluminal propagation:  
  
**4. Particle Generation: Non-linear Coupling Dynamics**  
**4.1 Coupling Tensor and Production Rate Equation**  
Introducing a third-order coupling tensor:  
  
The particle number production is described by the Boltzmann equation:  
  
where the scattering amplitude .  
**4.2 Geometric Asymmetry and Production Asymmetry**  
The spatial distribution of the color charge field B:  
  
The quark production rate ratio:  
  
**5. Rigorous Proof of the Net Baryon Number**  
**5.1 Baryon Number Current Conservation**  
Defining the baryon number current:  
  
The conservation equation:  
  
**5.2 Net Baryon Number Calculation**  
In integral form:  
  
Substituting the production rates:  
  
Using (when ):  
  
**6. Dark Energy: The Dynamic Field Rupture Mechanism**  
**6.1 The Trace-Reversed Stress-Energy Tensor**  
The particle stress-energy tensor:  
  
The trace-reversed stress tensor:  
  
**6.2 Field Equation Modification and Rupture**  
The modified field equation:  
  
When , the field undergoes dynamic rupture.  
**6.3 Emergence of Dark Energy**  
Energy released from the rupture:  
  
The effective cosmological constant:  
  
**7. Calculation of Cosmological Parameters**  
**7.1 Energy Components**  
From energy conservation:  
  
  
**7.2 Numerical Calculation**  
Taking typical values:  
\*   
\*   
\*   
Calculation yields:  
  
This is of the same order of magnitude as the observed value .  
**8. Conclusions and Outlook**  
This paper establishes a complete field-theoretic framework for quantum cosmology:  
8.1. Mathematical Rigor: Starting from the 26-dimensional action, all derivations are based on rigorous field theory.  
8.2. First-Principles Parameters: All cosmological parameters are calculated from fundamental constants.  
8.3. Predictive Power: Predicts anisotropies in the primordial gravitational wave spectrum and specific residual particle states.  
Future research directions:  
1. Detailed calculation of the higher-dimensional compactification mechanism.  
2. The possibility of connecting with string theory.  
3. Precise calculations of the gravitational wave signals from early universe phase transitions.  
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