Unified Model of Particle Physics Based on 26-Dimensional ABC Vortex Field Coupling and Its Emergent Properties  
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 **Abstract**  
This paper proposes a novel unified model of particle physics, whose core thesis is that the 62 elementary particles of the Standard Model are not fundamental entities but arise from specific coupling-mode excitations of three fundamental fields (A, B, C) in a 26-dimensional vortex field. By introducing a negative-mass background field , we demonstrate that all four fundamental forces (gravity, electromagnetism, weak force, strong force) emerge from the geometric properties of this coupled system. Key results include:  
1. Derivation of the 62 particle spectrum from the eigenmodes of the operator .  
2. Gravitational coupling constant emerges as .  
3. The Higgs mechanism is replaced by spontaneous symmetry breaking of the group.  
**1. Introduction**  
The Standard Model (SM) describes 62 elementary particles but lacks a unified origin. We propose that these particles are excitations of three coupled vortex fields , , in 26D spacetime:

where induces coupling. The negative-mass field satisfies:

This generates an effective metric , reproducing Einstein gravity in 4D.  
 **2. Particle Spectrum from Field Coupling**  
The 62 particles emerge as solutions to the eigenvalue equation:

where is defined in the Abstract. The mass hierarchy arises from the coupling constants:

- **Fermions**: Spin- modes from coupling.  
- **Bosons**: Spin-1 modes from coupling.  
- **Higgs**: Scalar mode from coupling.  
 **3. Emergence of Fundamental Forces**  
All forces derive from the Lagrangian density:

where:  
- **Electromagnetism**: (U(1) subgroup of ).  
- **Weak Force**: (SU(2) subgroup of ).  
- **Strong Force**: (SU(3) subgroup of ).  
- **Gravity**: , with as defined in Abstract.  
 **4. Experimental Predictions**  
4.1. **Collider Signatures**:  
- Decay channels (branching ratio ).  
- Excess events at TeV (LHC) from resonances.  
4.2. **Cosmological Tests**:  
- Graviton candidate must match GR predictions.  
- Inflation driven by -field; baryogenesis from CP-violating terms in .  
**References**  
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[3] Zee A. *Quantum Field Theory in a Nutshell*. Princeton University Press, 2010.