The Grand Theory of Everything (ToE)

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■ Unified Action: Master Equation

The total action S is composed of four main parts:

S = S_gravity + S_matter + S_gauge + S_quantum

Where:
- S_gravity → Quantum gravity action.
- S_matter → Matter field action.
- S_gauge → Gauge field (force) action.
- S_quantum → Quantum corrections.

■ I. Gravity Action (S_gravity)

1■■ Einstein-Hilbert Action (Classical Gravity)

S_gravity^EH = (1 / 16πG) ∫ d^4x √(-g) (R - 2Λ)

Describes how mass-energy curves spacetime in the context of General Relativity.

2■■ Loop Quantum Gravity (LQG) Extension

S_gravity^LQG = (1 / 8πG) ∫ d^4x √(-g) ε^abc E_a^i E_b^j F_ij^c

Quantizes spacetime itself, introducing discrete geometric structures.

3■■ String/M-Theory Gravity

S_gravity^String = (1 / 2κ^2) ∫ d^{10}x √(-g) e^{-2φ} [R + 4 (∇φ)^2 - (1/12) H_{μνρ} H^{μνρ}]

Models particles as vibrating strings in higher dimensions.

■■ II. Matter Action (S_matter)

1■■ Fermion Fields (Dirac Action)

S_fermion = ∫ d^4x √(-g) ψ■ (i γ^μ D_μ - m) ψ

Describes matter particles like electrons and quarks.

2■■ Higgs Field (Spontaneous Symmetry Breaking)

S_Higgs = ∫ d^4x √(-g) [(D_μ ϕ)† (D^μ ϕ) - V(ϕ)]