

The Complete Theory of Everything (ToE)

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■ Unified Action: Master Equation

The total action S is composed of four main parts:

$$S = S_{\text{gravity}} + S_{\text{matter}} + S_{\text{gauge}} + S_{\text{quantum}}$$

Where:

- $S_{\text{gravity}} \rightarrow$ Quantum gravity action.
- $S_{\text{matter}} \rightarrow$ Matter field action.
- $S_{\text{gauge}} \rightarrow$ Gauge field (force) action.
- $S_{\text{quantum}} \rightarrow$ Quantum corrections.

I. Gravity Action (S_{gravity})

1■■■ Einstein-Hilbert Action (Classical Gravity)

$$S_{\text{gravity}}^{\text{EH}} = (1 / 16\pi G) \int d^4x \sqrt{-g} (R - 2\Lambda)$$

2■■■ Loop Quantum Gravity (LQG) Extension

$$S_{\text{gravity}}^{\text{LQG}} = (1 / 8\pi G) \int d^4x \sqrt{-g} \epsilon^{abc} E_a^i E_b^j F_{ij}^c$$

3■■■ String/M-Theory Gravity

$$S_{\text{gravity}}^{\text{String}} = (1 / 2\kappa^2) \int d^4x \sqrt{-g} e^{-2\phi} [R + 4 (\nabla\phi)^2 - (1/12) H_{\{\mu\nu\rho\}} H^{\{\mu\nu\rho\}}]$$

■ II. Matter Action (S_{matter})

1■■■ Fermion Fields (Dirac Action)

$$S_{\text{fermion}} = \int d^4x \sqrt{-g} \bar{\psi} (i \gamma^\mu D_\mu - m) \psi$$

2■■■ Higgs Field (Spontaneous Symmetry Breaking)

$$S_{\text{Higgs}} = \int d^4x \sqrt{-g} [(D_\mu \phi)^\dagger (D^\mu \phi) - V(\phi)]$$

■ III. Gauge Field Action (S_{gauge})

1■■■ Yang-Mills Action (Non-Abelian Gauge Fields)

$$S_{\text{gauge}} = -(1 / 4) \int d^4x \sqrt{-g} F_{\{\mu\nu\}}^a F^{\{\mu\nu\}}_a$$