

# Mathematische Struktur der T0-Theorie

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# Kapitel 1

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## **Zusammenfassung**

Dieses Dokument präsentiert die mathematische Struktur der T0-Theorie, einschließlich der zugrunde liegenden Differentialgeometrie, Lie-Gruppen und algebraischen Strukturen.

## 1.1 Geometrische Grundlagen

### 1.1.1 Die Raumzeit-Mannigfaltigkeit

Die T0-Theorie operiert auf einer 4-dimensionalen Mannigfaltigkeit  $\mathcal{M}$  mit Metrik:

$$ds^2 = g_{\mu\nu} dx^\mu dx^\nu \quad (1.1)$$

### 1.1.2 Das Zeitfeld als Skalarfeld

Das intrinsische Zeitfeld ist ein Skalarfeld auf  $\mathcal{M}$ :

$$T : \mathcal{M} \rightarrow \mathbb{R}^+ \quad (1.2)$$

## 1.2 Algebraische Struktur

### 1.2.1 Die T0-Algebra

Die fundamentalen Operatoren erfüllen:

$$[\hat{T}, \hat{E}] = i\hbar \quad (1.3)$$

Dies ist analog zur kanonischen Quantisierung.

### 1.2.2 Symmetriegruppen

Die T0-Theorie respektiert:

- Poincaré-Gruppe (Lorentz-Transformationen + Translationen)
- Lokale Eichsymmetrien ( $U(1)$ ,  $SU(2)$ ,  $SU(3)$ )
- Zeit-Masse-Dualitätssymmetrie:  $T \leftrightarrow 1/m$

## 1.3 Differentialgleichungen

### 1.3.1 Die T0-Feldgleichung

Das Zeitfeld erfüllt:

$$\square T + V'(T) = J \quad (1.4)$$

wobei  $V(T)$  das Potential und  $J$  die Quelldichte ist.

#### Mathematische Konsistenz

Die T0-Theorie ist mathematisch konsistent:

- Kovarianz unter Lorentz-Transformationen
- Unitäre Quantenmechanik
- Renormierbare Feldtheorie

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