Teilchenmassen

Johann Pascher

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Kapitel 1

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Zusammenfassung

Dieses Dokument präsentiert die parameterfreie Berechnung aller Standardmodell-Fermionenmassen aus den fundamentalen T0-Prinzipien. Zwei mathematisch äquivalente Methoden werden parallel vorgestellt: die direkte geometrische Methode $m_i = \frac{K_{\text{frak}}}{\xi_i}$ und die erweiterte Yukawa-Methode $m_i = y_i \times v$. Beide verwenden ausschließlich den geometrischen Parameter $\xi_0 = \frac{4}{3} \times 10^{-4}$ mit systematischen fraktalen Korrekturen $K_{\text{frak}} = 0,986$. Für etablierte Teilchen (geladene Leptonen, Quarks, Bosonen) erreicht das Modell eine durchschnittliche Genauigkeit von 99,0%. Die mathematische Äquivalenz beider Methoden wird explizit bewiesen.

1.1 Einführung: Das Massenproblem des Standardmodells

1.1.1 Die Willkürlichkeit der Standardmodell-Massen

Das Standardmodell der Teilchenphysik leidet unter einem fundamentalen Problem: Es enthält über 20 freie Parameter für Teilchenmassen, die experimentell bestimmt werden müssen, ohne theoretische Begründung für ihre spezifischen Werte.

Teilchenklasse	**Anzahl der Massen**	**Wertebereich**
Geladene Leptonen	3	$0,511$ MeV $-$ 1777 MeV
Quarks	6	$2,2$ MeV $-$ 173 GeV
Neutrinos	3	$< 0,1$ eV (Obergrenzen)
Bosonen	3	80 GeV $-$ 125 GeV
Gesamt	**15**	**Faktor** $> 10^{11}$

Tabelle 1.1: Standardmodell-Teilchenmassen: Anzahl und Wertebereiche

1.1.2 Die T0-Revolution

T0-Hypothese: Alle Massen aus einem Parameter

Die T0-Theorie behauptet, dass alle Teilchenmassen aus einem einzigen geometrischen Parameter berechnet werden können:

$$\boxed{\text{Alle Massen} = f(\xi_0, \text{Quantenzahlen}, K_{\text{frak}})} \tag{1.1}$$

wobei:

- $\xi_0 = \frac{4}{3} \times 10^{-4}$ (geometrische Konstante)
- Quantenzahlen (n, l, j) bestimmen die Teilchenidentität
- $K_{\text{frak}} = 0,986$ (fraktale Raumzeit-Korrektur)

Parameterreduktion: Von 15+ freien Parametern auf 0!

1.2 Die beiden T0-Berechnungsmethoden

1.2.1 Konzeptionelle Unterschiede

Die T0-Theorie bietet zwei komplementäre, aber mathematisch äquivalente Ansätze:

Methode 1: Direkte geometrische Resonanz

- **Konzept:** Teilchen als Resonanzen eines universellen Energiefeldes
- **Formel:** $m_i = \frac{K_{\text{frak}}}{\xi_i}$
- **Vorteil:** Konzeptionell fundamental und elegant

- **Basis:** Reine Geometrie des 3D-Raumes

Methode 2: Erweiterte Yukawa-Kopplung

- **Konzept:** Brücke zum Standardmodell-Higgs-Mechanismus
- **Formel:** $m_i = y_i \times v$
- **Vorteil:** Vertraute Formeln für experimentelle Physiker
- **Basis:** Geometrisch bestimmte Yukawa-Kopplungen

1.2.2 Mathematische Äquivalenz

Beweis der Äquivalenz beider Methoden:

Beide Methoden müssen identische Ergebnisse liefern:

$$\frac{K_{\text{frak}}}{\xi_i} = y_i \times v \tag{1.2}$$

Mit $v = \xi_0^8 \times K_{\text{frak}}$ (T0 Higgs VEV) folgt:

$$y_i = \frac{1}{\xi_i \times \xi_0^8} \tag{1.3}$$

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