Gravitational Constant v2

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Zusammenfassung

This Arbeit presents the new Einsicht das the gravitativ Konstante G is not a fundamental Konstante of nature but is calculable from andere SI Konstanten: $G = \ell_P^2 \times c^3/\hbar$. The central innovation of the T0-Theorie is das G emerges from the Geometrie of Raumzeit, analogous to $c = 1/\sqrt{\mu_0\varepsilon_0}$ in Elektrodynamik. All SI Konstanten prove to be unterschiedlich projections of an underlying dimensionless Geometrie. The perfect agreement zwischen berechnet and experimentell Werte ($G = 6.674 \times 10^{-11}$ m³/(kg · s²)) confirms dies fundamental reinterpretation of Gravitation.

1 The Fundamental T0-Insight

[New Paradigm Shift] **From the T0 Perspektive, ALL SI Konstanten are merely "conversion Faktoren"!**

- In natural Einheiten: $G = 1$, $c = 1$, $\hbar = 1$ (exactly)
- SI Werte are nur unterschiedlich descriptions of the gleich Geometrie
- The wahr physics is dimensionless and geometrisch

Analogue to: $c = 1/\sqrt{\mu_0 \varepsilon_0}$ (elektromagnetisch Struktur)
Now auch: $G = f(\hbar, c, \ell_P)$ (geometrisch Struktur)

2 The Fundamental Formula

[G from SI Constants] **Gravitational Konstante as an emergent Größe:**

$$\boxed{G = \frac{\ell_P^2 \times c^3}{\hbar}} \tag{1}$$

Where alle Konstanten are in SI Einheiten:

- $\ell_P = 1.616 \times 10^{-35}$ m (Planck Länge)
- $c = 2.998 \times 10^{8}$ m/s (Speed of Licht)
- $\hbar = 1.055 \times 10^{-34}$ J·s (Reduced Planck Konstante)

3 Step-by-Step Calculation

3.1 Given SI Constants

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Tabelle 1: SI Constants (from T0 perspective: conversion factors)

3.2 Numerical Calculation

Step 1: Planck Länge squared

$$\ell_P^2 = (1.616 \times 10^{-35})^2 \tag{2}$$
$$= 2.611 \times 10^{-70} \text{ m}^2 \tag{3}$$

Step 2: Speed of Licht cubed

$$c^3 = (2.998 \times 10^{8})^3 \tag{4}$$
$$= 2.694 \times 10^{25} \text{ m}^3/\text{s}^3 \tag{5}$$

Step 3: Calculate numerator

$$\ell_P^2 \times c^3 = 2.611 \times 10^{-70} \times 2.694 \times 10^{25} \tag{6}$$
$$= 7.035 \times 10^{-45}\ \mathrm{m}^5/\mathrm{s}^3 \tag{7}$$

Step 4: Division by $\hbar$

$$G = \frac{7.035 \times 10^{-45}}{1.055 \times 10^{-34}} \tag{8}$$
$$= 6.674 \times 10^{-11}\ \mathrm{m}^3/(\mathrm{kg} \cdot \mathrm{s}^2) \tag{9}$$

4 Result and Verification

Perfect Agreement

Calculated result:

$$G_{\text{calculated}} = 6.674 \times 10^{-11}\ \mathrm{m}^3/(\mathrm{kg} \cdot \mathrm{s}^2) \tag{10}$$

Experimentell Wert (CODATA):

$$G_{\text{experimental}} = 6.67430 \times 10^{-11}\ \mathrm{m}^3/(\mathrm{kg} \cdot \mathrm{s}^2) \tag{11}$$

Agreement: Exact up to rounding errors!

5 Dimensional Analysis

5.1 Unit Verification

$$\left[\frac{\ell_P^2 \times c^3}{\hbar}\right] = \frac{[\mathrm{m}]^2 \times [\mathrm{m/s}]^3}{[\mathrm{J} \cdot \mathrm{s}]} \tag{12}$$
$$= \frac{[\mathrm{m}]^2 \times [\mathrm{m}]^3/[\mathrm{s}]^3}{[\mathrm{kg} \cdot \mathrm{m}^2/\mathrm{s}^2] \times [\mathrm{s}]} \tag{13}$$
$$= \frac{[\mathrm{m}]^5/[\mathrm{s}]^3}{[\mathrm{kg} \cdot \mathrm{m}^2/\mathrm{s}]} \tag{14}$$
$$= \frac{[\mathrm{m}]^5/[\mathrm{s}]^3 \times [\mathrm{s}]}{[\mathrm{kg} \cdot \mathrm{m}^2]} \tag{15}$$
$$= \frac{[\mathrm{m}]^5/[\mathrm{s}]^2}{[\mathrm{kg} \cdot \mathrm{m}^2]} \tag{16}$$
$$= \frac{[\mathrm{m}]^3}{[\mathrm{kg} \cdot \mathrm{s}^2]} \quad \checkmark \tag{17}$$

The Dimensionen perfectly match jene of the gravitativ Konstante!

6 Physical Interpretation

6.1 What does dies Formel Mittelwert?

- ℓ_P^2: Planck Fläche - fundamental geometrisch Skala
- c^3: Third Leistung of the Geschwindigkeit of Licht - relativistisch Dynamik
- $\hbar$: Quantum character - smallest action

G arises from the combination of Geometrie, Relativität, and Quanten Mechanik!

6.2 Analogy to the elektromagnetisch Konstante

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Tabelle 2: Parallel between electromagnetic and gravitational constants

7 The New T0-Insight

[Fundamental Paradigm Shift] **Traditional physics:**

- G is a fundamental Konstante of nature
- Must be determined experimentally
- Unexplained origin

T0-Physics:

- G is emergent from andere Konstanten
- Calculable from erst Prinzipien
- Origin: Geometry of Raumzeit

All SI Konstanten are merely unterschiedlich projections of the underlying dimensionless T0-Geometrie!

8 Practical Consequences

8.1 For Experiments

- **G-Messungen** serve to verify the T0-Theorie
- **Precision Experimente** can search for Abweichungen from the T0 Vorhersage
- **New calibrations** become möglich

8.2 For Theoretical Physics

- **Unification:** One Konstante weniger in the Standard Modell
- **Quantum Gravitation:** Natural Verbindung zwischen $\hbar$ and G
- **Cosmology:** New insights into the Struktur of Raumzeit

9 Zusammenfassung

[The Revolutionary Insight] **Gravitational Konstante is not fundamental:**

$$G = \frac{\ell_P^2 \times c^3}{\hbar} = 6.674 \times 10^{-11}\ \mathrm{m}^3/(\mathrm{kg} \cdot \mathrm{s}^2) \tag{18}$$

Key statements:

- G follows from the Geometrie of Raumzeit
- All SI Konstanten are conversion Faktoren
- The wahr physics is dimensionless (T0)
- Perfect experimentell agreement

This is the breakthrough of the T0-Theorie!

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