

Mass–Velocity Relation in New Gravitational Field Theory and Cosmic Expansion Mechanism

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Abstract

This paper proposes a new gravitational field theory in which gravity arises from the interaction between gravitational fields, rather than direct attraction between masses. Based on the conversion between mass energy and field energy, two mass–velocity equations under acceleration and deceleration are derived respectively. Through an acceleration–deceleration cycle, the net mass growth of an object is obtained, which provides a new mechanism for dark energy and cosmic acceleration without global energy conservation. The theory is consistent with the light propagation dynamics in the absolute theory, and can explain the observed light deflection in the solar eclipse without the hypothesis of spacetime curvature.

Résumé

Cet article propose une nouvelle théorie du champ gravitationnel dans laquelle la gravité provient de l'interaction entre champs gravitationnels, plutôt que de l'attraction directe entre masses. Sur la base de la conversion entre énergie de masse et énergie de champ, deux équations masse–vitesse sous accélération et décélération sont dérivées respectivement. Par un cycle accélération–décélération, la croissance nette de la masse d'un objet est obtenue, ce qui fournit un

nouveau mécanisme pour l'énergie sombre et l'accélération cosmique sans conservation globale de l'énergie. La théorie est cohérente avec la dynamique de propagation de la lumière dans la théorie absolue et peut expliquer la déflexion lumineuse observée lors de l'éclipse solaire sans l'hypothèse de courbure de l'espace-temps.

1 1. Introduction

Relativity provides accurate descriptions of many physical phenomena, but its denial of absolute space leads to theoretical boundaries. Based on the concept of absolute space and field interaction, this paper establishes a new gravitational field theory and derives mass-velocity relations under acceleration and deceleration. A mass growth mechanism through cycles is proposed, which can account for cosmic expansion and dark energy without spacetime expansion. This theory is highly consistent with the light propagation dynamics in the absolute theory.

2 2. Core Postulates

1. Gravity originates from the interaction between gravitational fields, not direct mass attraction.
2. Mass energy and field energy can be converted into each other, following the differential relation of $E = mc^2$.
3. The total energy of an object can vary; no global energy conservation constraint is imposed.

3 3. Mass–Velocity Relations in Acceleration and Deceleration

From the perspective of absolute space, the velocity change of an object corresponds to the transformation between mass energy and field energy.

3.1 3.1 Acceleration Process (Mass Energy \rightarrow Field Energy)

$$\frac{1}{2}mv^2 = c^2(m - m_0) \quad (1)$$

The mass–velocity relation is

$$m = \frac{m_0}{1 - \frac{v^2}{2c^2}} \quad (2)$$

At $v = c$, we obtain $m = 2m_0$, which represents the equivalent gravitational mass of a photon.

3.2 3.2 Deceleration Process (Field Energy \rightarrow Mass Energy)

$$\frac{1}{2}mv^2 = c^2(m_0 - m) \quad (3)$$

The mass–velocity relation is

$$m = \frac{m_0}{1 + \frac{v^2}{2c^2}} \quad (4)$$

4 4. Mass Growth in Acceleration–Deceleration Cycle

An object starts from rest with mass m_0 .

1. Accelerated to $v = c$: $m = 2m_0$. 2. Decelerated from c to rest: the rest mass becomes $3m_0$.

A full cycle yields **net mass growth** $\Delta m = 2m_0$. This mechanism provides a natural explanation for cosmic expansion and dark energy without additional hypothetical components.

5 5. Explanation of Light Deflection

The photon equivalent mass $m = 2m_0$ derived in this theory directly yields the light deflection angle observed in the solar eclipse, consistent with measurements without the assumption of spacetime curvature.

6 6. Consistency with the Absolute Theory

This new gravitational field theory is fully consistent with the light propagation dynamics in the absolute theory. The conversion between mass energy and field energy corresponds to the process of light condensation and darkening in the absolute theory, forming a unified physical framework.

7 7. Conclusion

A new gravitational field theory is established based on field interaction and absolute space. Two mass–velocity equations for acceleration and deceleration are derived. The cycle mass growth mechanism explains cosmic expansion and dark energy. The theory is compatible with the absolute theory and can explain observational facts without spacetime curvature.

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9 References

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