

# A Phenomenological Kinetic Model of Gravity: Pressure from Ultrahigh-Frequency Gravitational Waves with Matter Conversion and Shadow Interpretation

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(Dated: January 22, 2026)

We explore a phenomenological model in which gravitational acceleration emerges from the pressure of an isotropic bath of ultrahigh-frequency gravitational waves (UHF-GWs). These waves are converted into matter inside planets via  $E = mc^2$ , driving net mass inflow. Externally, this manifests as a shadow effect: reduced wave flux from the planet's interior direction, while full pressure from outside pushes objects toward the center. Using the proton as reference, we derive pressure, flux, and Earth's equivalent accretion rate ( $\Omega \approx 3.20 \times 10^{-16} \text{ s}^{-1}$ ), numerically similar to alternative expanding-Earth values. An effective volume with  $r_{\text{eff}} = (4/\pi)r_{\text{compt}}$  yields  $G \approx 6.879 \times 10^{-11} \text{ m}^3\text{kg}^{-1}\text{s}^{-2}$  (3.1% above CODATA). Despite intriguing numerical alignments, the model conflicts with GW bounds, geodetic data, and lacks rigorous microphysics. It is presented as an exploratory toy model.

PACS numbers: 04.50.-h, 04.80.Nn, 95.36.+x

## I. INTRODUCTION

General relativity describes gravity as spacetime curvature, but historical and alternative approaches have sought mechanical explanations [3, 4]. Motivated by kinetic/push theories and expanding-Earth hypotheses [1, 2], we propose that gravitational acceleration arises from pressure exerted by an isotropic bath of ultrahigh-frequency gravitational waves (UHF-GWs). These waves are converted into matter inside celestial bodies via  $E = mc^2$ , producing net inward mass inflow. From an external viewpoint, this creates a shadow-like effect: wave flux is reduced from the direction of the body (due to conversion/absorption), while full isotropic pressure from the opposite side pushes objects toward the center—yielding apparent attraction.

We use the proton to compute micro-scale pressure and macro-scale accretion, then derive  $G$  via an effective volume. This remains a phenomenological exploration with numerical coincidences, not a fundamental theory.

## II. MODEL AND DERIVATIONS

The force on a proton ( $m_p = 1.67262192369 \times 10^{-27} \text{ kg}$ ) under Earth's gravity ( $g = 9.80665 \text{ m/s}^2$ ) is

$$F = m_p g \approx 1.642 \times 10^{-26} \text{ N}. \quad (1)$$

Proton Compton wavelength:

$$r_{\text{compt}} = \frac{h}{m_p c} \approx 1.32141 \times 10^{-15} \text{ m}. \quad (2)$$

Effective interaction area (azimuthal averaging analogy):

$$S = 2\pi r_{\text{compt}}^2 \approx 1.097 \times 10^{-29} \text{ m}^2. \quad (3)$$

Pressure:

$$P = F/S \approx 1.497 \times 10^3 \text{ Pa}. \quad (4)$$

Isotropic energy density:

$$U = 3P \approx 4.49 \times 10^3 \text{ J/m}^3. \quad (5)$$

Energy flux:

$$E = Uc \approx 1.346 \times 10^{12} \text{ W/m}^2. \quad (6)$$

Earth cross-section  $S_{\text{Earth}} = \pi R^2 \approx 1.275 \times 10^{14} \text{ m}^2$  ( $R = 6371 \text{ km}$ ). Assuming UHF-GW energy is converted to matter inside the planet via  $E = mc^2$ , the equivalent accretion rate is

$$\frac{dM}{dt} = \frac{ES_{\text{Earth}}}{c^2} \approx 1.908 \times 10^9 \text{ kg/s}. \quad (7)$$

Specific rate:

$$\Omega = \frac{1}{M_{\text{Earth}}} \frac{dM}{dt} \approx 3.20 \times 10^{-16} \text{ s}^{-1}, \quad (8)$$

( $M_{\text{Earth}} = 5.972 \times 10^{24} \text{ kg}$ ). This aligns numerically with alternative expansion models [1, 2].

For  $G$ , effective radius (circumference-to-diameter geometric scaling):

$$r_{\text{eff}} = \frac{4}{\pi} r_{\text{compt}} \approx 1.682 \times 10^{-15} \text{ m}. \quad (9)$$

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Volume:

$$V = \frac{4}{3}\pi r_{\text{eff}}^3 \approx 1.995 \times 10^{-44} \text{ m}^3. \quad (10)$$

Density parameter:

$$\mu_h = \frac{h}{V} \approx 3.321 \times 10^{10} \text{ kg m}^{-1} \text{ s}^{-1}. \quad (11)$$

Gravitational constant:

$$G = \frac{c^2 \Omega}{4\pi \mu_h} \approx 6.879 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}, \quad (12)$$

3.1% above CODATA.

### III. NET PRESSURE IMBALANCE CALCULATION

In the shadow interpretation, the net gravitational force on a proton at Earth's surface arises from a pressure imbalance  $\Delta P = P_1 - P_2$ , where  $P_1$  is the full wave pressure from non-shadowed directions (outside the planet), and  $P_2$  is the reduced pressure from the shadowed interior direction (due to wave conversion to matter via  $E = mc^2$ ).

The observed force on the proton is

$$F = m_p g \approx 1.6403 \times 10^{-26} \text{ N}, \quad (13)$$

using precise values  $m_p = 1.67262192369 \times 10^{-27} \text{ kg}$  and  $g = 9.80665 \text{ m/s}^2$ .

The effective interaction area is

$$S = 2\pi r_{\text{compt}}^2 \approx 1.0971 \times 10^{-29} \text{ m}^2, \quad (14)$$

with  $r_{\text{compt}} \approx 1.32141 \times 10^{-15} \text{ m}$ .

The net pressure imbalance is thus

$$\Delta P = \frac{F}{S} \approx 1.495 \times 10^3 \text{ Pa}. \quad (15)$$

This  $\Delta P$  quantifies the differential push: full  $P_1 \approx 1.495 \times 10^3 \text{ Pa}$  from outside, with  $P_2 \approx 0$  from the interior (idealized full absorption/conversion), producing the net inward acceleration.

### IV. DISCUSSION AND LIMITATIONS

The model posits that isotropic UHF-GWs exert pressure everywhere, but conversion to matter inside planets creates a directional imbalance (reduced flux from the body, full push from outside), producing net inward acceleration. The net pressure  $\Delta P \approx 1.495 \times 10^3 \text{ Pa}$  (Section III) drives the effective  $g$ , with derived accretion and  $G$  showing numerical interest.

This is an exploratory toy model, not a physical theory.

### V. COMPARISON TO LE SAGE'S THEORY OF GRAVITATION

This framework echoes Le Sage's push gravity [3, 4], where isotropic corpuscles produce attraction via shielding. Here, UHF-GWs provide the flux; conversion to matter inside the body acts as an effective absorber, reducing wave pressure from that direction while external waves push toward the center—analogueous to a dynamic shadow. The calculated  $\Delta P$  quantifies this imbalance, similar to Le Sage's corpuscle flux reduction.

Parallels: flux-imbalance mechanism, mechanical gravity, potential mass increase. Modern features ( $c$  propagation, quantum scaling,  $E = mc^2$ ) address some classical issues [4], but flux detectability and equivalence principle concerns persist.

#### Appendix A: Force and Pressure

$$\begin{aligned} F &= m_p g \\ &= 1.67262192369 \times 10^{-27} \times 9.80665 \\ &= 1.6415 \times 10^{-26} \text{ N} \quad (\approx 1.642 \times 10^{-26}). \end{aligned} \quad (\text{A1})$$

$$\begin{aligned} r_{\text{compt}} &= \frac{h}{m_p c} \\ &\approx 1.32141 \times 10^{-15} \text{ m}, \end{aligned} \quad (\text{A2})$$

$$\begin{aligned} S &= 2\pi r_{\text{compt}}^2 \\ &\approx 1.097 \times 10^{-29} \text{ m}^2, \end{aligned} \quad (\text{A3})$$

$$\begin{aligned} P &= F/S \\ &\approx 1.497 \times 10^3 \text{ Pa}, \end{aligned} \quad (\text{A4})$$

$$\begin{aligned} U &= 3P \\ &\approx 4.49 \times 10^3 \text{ J/m}^3. \end{aligned} \quad (\text{A5})$$

#### Appendix B: Mass Accretion Rate

$$\begin{aligned} E &= Uc \\ &\approx 1.346 \times 10^{12} \text{ W/m}^2, \end{aligned} \quad (\text{B1})$$

Appendix C: Derivation of  $G$ 

$$S_{\text{Earth}} = \pi(6.371 \times 10^6)^2 \\ \approx 1.275 \times 10^{14} \text{ m}^2, \quad (\text{B2})$$

$$\frac{dM}{dt} = \frac{E S_{\text{Earth}}}{c^2} \\ \approx 1.908 \times 10^9 \text{ kg/s}, \quad (\text{B3})$$

$$\Omega = \frac{dM/dt}{M_{\text{Earth}}} \\ \approx 3.20 \times 10^{-16} \text{ s}^{-1}. \quad (\text{B4})$$

$$r_{\text{eff}} = \frac{4}{\pi} r_{\text{compt}} \\ \approx 1.682 \times 10^{-15} \text{ m}, \quad (\text{C1})$$

$$V = \frac{4}{3} \pi r_{\text{eff}}^3 \\ \approx 1.995 \times 10^{-44} \text{ m}^3, \quad (\text{C2})$$

$$\mu_h = \frac{h}{V} \\ \approx 3.321 \times 10^{10} \text{ kg m}^{-1} \text{ s}^{-1}, \quad (\text{C3})$$

$$G = \frac{c^2 \Omega}{4\pi \mu_h} \\ \approx 6.879 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}. \quad (\text{C4})$$

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[1] V. F. Blinov, "Kinetic Gravity," 2012.

[2] J. Maxlow, PhD dissertation, Curtin University, 2001.

[3] G.-L. Le Sage, "Lucrèce Newtonien," 1784.

[4] M. R. Edwards (Ed.), "Pushing Gravity," Apeiron, 2002.