Aq - The Universal Acceleration Constant.

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Thesis Statement:

This paper demonstrates that the traditional Planck scales are dimensional artifacts rather than physical limits. The true minimum measurable spans of nature are **Tiny Length (ιl)** and **Tiny Time (ιt),** derived from the mattergy–acceleration coupling constant **Aq**, which replaces **G** as the proper universal constant.

Mathematics operates on scalars.

Algebra and calculus operate only on quantities that are scalar — pure magnitudes, simple numbers that participate in arithmetic operations: addition, subtraction, multiplication, and division. A scalar must be dimensionally uniform. Mathematics is structurally scalar-dependent. Any constant used in fundamental equations must be scalar.

Discovery: G is not scalar.

A quantity is **algebraically invalid** when it is treated as a scalar while carrying dimensions. The Universal Gravitational Constant $\boldsymbol{G}$ is $\mathbf{m^3\ kg^{-1}\ s^{-2}}$. $\boldsymbol{G}$ cannot participate in scalar operations without producing **dimensional artifacts**.

Discovery: Aq is scalar.

Aq is a single, indivisible symbol, mattergy–acceleration coupling constant. The lowercase "q" is part of the symbol and is **not** a variable; it signifies that the constant is *quantum-anchored*, ensuring compatibility with Standard Quantum Mechanics

Mattergy is invariant. $(mc^2)^2 + (pc)^2$

Planck Length $l_p = \sqrt{\frac{\hbar G}{c^3}} \rightarrow G = \frac{c^3}{\hbar} l_p^2$

Planck Time $t_p = \sqrt{\frac{\hbar G}{c^5}} \rightarrow G = \frac{c^5}{\hbar} t_p^2$

Tiny Length $\imath l = \sqrt{\frac{\hbar A_q}{c^3}} \rightarrow A_q = \frac{c^3}{\hbar} \imath l^2$

Tiny Time $\imath t = \sqrt{\frac{\hbar A_q}{c^5}} \rightarrow A_q = \frac{c^5}{\hbar} \imath t^2$

Where:

G is the Universal Gravitational Constant.

A_q is the Universal Acceleration Constant.

$\hbar$ (h-bar) is the reduced Planck Constant.

c is the speed of light in vacuum.

The gravitational constant ***G*** *was* first obtained experimentally by measuring the tiny attraction between known masses and solving

$$F = G\,\frac{m_1 m_2}{r^2}$$

The modern value of ***G*** is said to be $\boldsymbol{G \approx 6.674 \times 10^{-11}\ \mathrm{m^3 kg^{-1} s^{-2}}}$, a quantity that is notoriously harder to pin down experimentally than $\boldsymbol{\pi}$ is to compute numerically. G is not a scalar. Since $\boldsymbol{G}$ is not a scalar, the Cavendish experiment is best understood as providing empirical calibration data rather than a fundamental constant. The same data can be used to compute the acceleration constant $\boldsymbol{A_Q}$, which *is* scalar, invariant, and grounded in the full mattergy expression $\boldsymbol{(mc^2)^2 + (pc)^2}$.

The Cavendish result uses only mass, which corresponds to only one component of the mattergy invariant $\boldsymbol{(mc^2)^2 + (pc)^2}$. The acceleration constant $\boldsymbol{A_Q}$ is computed in the exact same way, using the exact same data. In Cavendish's static, low-velocity regime, the energy–momentum term $\boldsymbol{(pc)^2}$ is effectively zero and can be neglected without loss of accuracy. Consequently, the computation produces the same value (or extremely close to the value) attributed to $\boldsymbol{G}$.

Once the full invariant is taken into account**—where $\boldsymbol{(pc)^2}$ becomes significant—** the value of $\boldsymbol{A_Q}$ reduces accordingly. This produces marked and physically meaningful changes in the values of **Tiny Length** and **Tiny Time.**

Law of Universal Acceleration: $$\mathrm{a} = \mathrm{A_Q}\frac{M_1 M_2}{r^2}$$

Using acceleration rather than force, the units of acceleration cancel, leaving a pure scalar.

Acceleration expressed with positive exponents: $\frac{\mathbf{m}}{\mathbf{s^2}}$ **...**

The time-squared term moves to the denominator with a positive exponent. Because the **Modern Newtonian Framework** uses acceleration as the primitive rather than force, no residual unit-conversion factor is required; the constant A_Q multiplies two scalars and therefore remains scalar itself.

Conclusion:

G is an empirical constant tied to macroscopic gravitational behavior, not a fundamental coupling. It does not appear in Special Relativity, Quantum Mechanics, or the invariant energy–momentum relation. Although Einstein himself noted that **G** was an unsatisfactory and non-fundamental constant, he retained it in the field equations because no alternative coupling was available at the time.

Aq couples mattergy to acceleration directly. **Aq** is QM compatible by construction. Replacing **G** with **Aq** removes the dimensional artifacts that produce the traditional Planck scales and yields the revised minimum spans **ıl** and **ıt** without additional assumptions. In the acceleration-based formulation, all dimensional factors cancel cleanly, leaving **Aq** as the sole scalar coupling between two mattergy invariants; this is precisely what makes the Modern Newtonian Framework fundamentally different from Newton's force-based formulation.

The Modern Newtonian Framework: www.newearthinvest.com