

The G and the c^5 of the Quadrupole Formula Cannot Be Separated

— 3rd ed.: in the **Yamagishi 5D Gravitational Wave Discharge Theory**, G/c^5 is the reciprocal of the Planck power, and the two 5s have different origins — [Paper 42]

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— *From thinking to syncing.* —

Abstract

This paper carried an expression obtained by substituting $G = 4\pi$ into the gravitational-wave quadrupole formula $P = \frac{G}{5c^5} \langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle$. The third edition first corrects an arithmetic error contained in that rewriting, and then restates what the substitution does and does not reveal. First, there is an error to correct. The second edition factored the coefficient as $\frac{4\pi}{5c^5} = 4\pi \times \frac{5}{c^5}$, and also wrote $P = 4\pi \cdot \left(\frac{c^5}{5}\right)^{-1} \cdot \ddot{Q}^2$. Both are wrong: $\left(\frac{c^5}{5}\right)^{-1} = \frac{5}{c^5}$, which is not $\frac{1}{5c^5}$, and the two differ by a factor of 25 (2.594635×10^{-41} against 1.037854×10^{-42} with c at its SI value; verified here). The correct factorisation is $\frac{4\pi}{5c^5} = 4\pi \times \frac{1}{5} \times c^{-5}$. The formula itself was written correctly in the second edition; only the factorisation was wrong, but it was repeated in four places. Second, and the core of this edition: G and c^5 cannot be separated inside this formula. What appears is the single combination $\frac{G}{c^5}$, which is nothing other than the reciprocal of the Planck power $P_{Pl} = c^5/G = 3.628255 \times 10^{52} \text{ W}$. That is,

$$P = \frac{1}{5} \cdot \frac{\langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle}{P_{Pl}}$$

(verified here to be numerically identical), and G never appears alone anywhere. Third, the substitution therefore reveals no structure. Setting $G = a$ makes the coefficient $\frac{a}{5c^5}$, and the ratio to the true value is exactly a/G (1.88×10^{11} for $a = 4\pi$; verified here): the substitution merely rescales the whole formula uniformly; it does not isolate a factor of 4π . As Paper 116 showed, the patch constant may be any $a > 0$, so choosing 4π is a convention (Paper 95). Fourth, the two 5s have different origins (the second edition's verdict, now with numerical checks). The 5 of c^5 is fixed uniquely by dimensional analysis (the length equation and the time equation both give $N = -5$; verified here), while the $\frac{1}{5}$ arises from an angular average over the sphere: $\langle n_i n_j n_k n_l \rangle = \frac{1}{15} (\delta_{ij} \delta_{kl} + \delta_{ik} \delta_{jl} + \delta_{il} \delta_{jk})$, checked here by Monte Carlo over four million points with a maximum deviation of 9.8×10^{-5} . Neither is a count of spatial dimensions. Fifth, the citation to Paper 34 is updated. The second edition still cited Paper 34 under its retracted title ("5D Dimensional Leakage Theory"). Paper 34's third edition has since completed a census of the c^5 s, concluding that the c^5 of the Planck power, of the quadrupole formula and of the Planck time all fold into the single root c^5/G . This third edition is the quadrupole instance of that census. Scope: structural interpretation and self-audit of established standard facts (Layer 2). The quadrupole formula is not altered in any way. The exponent 5 is not read as a dimension, 4π is not treated as a forced value, and no new physics of gravitational waves is asserted.

Standing of this paper (discipline): the physics used here is **entirely standard**: Einstein’s quadrupole formula (1918), dimensional analysis, tensor averages over the sphere, the Planck power. **No new theorem and no prediction.** The third edition’s contribution is **a correction and an addressing**: (i) correcting a **factor-of-25 error** in the factorisation of the coefficient, (ii) showing that G and c^5 appear **only in the single combination G/c^5** , (iii) making explicit that the substitution therefore **changes a name rather than revealing a structure**, (iv) supplying **numerical checks** for the distinctness of the two 5s, and (v) updating the citation to Paper 34’s third edition. **The most important restraints: the exponent 5 is not read as a count of spatial dimensions** (dimensional analysis and an angular average; already retracted in the second edition). **4π is not called a forced value** (any patch constant will do; Papers 116, 95). **A substitution is not called a discovery** (it is a rewriting that follows from a choice of units). **The predictive power of the quadrupole formula does not depend on how G is written numerically. Randall–Sundrum and extra dimensions are not touched** (that reading was retracted in the second edition and is not reinstated). Layer-3 lenses (the “cosmic OS” and the like) are **kept out of the body** and quarantined under a non-scientific label.

1. Introduction: First, the Error in the Rewriting

Einstein’s quadrupole formula (1918) gives the radiated power of gravitational waves as

$$P = \frac{G}{5c^5} \langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle$$

where Q_{ij} is the traceless reduced quadrupole moment, $\langle \cdot \rangle$ a time average, and **the square on the right is a tensor contraction**. This paper gave the expression obtained by substituting $G = 4\pi$,

$$P = \frac{4\pi}{5c^5} \langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle.$$

That expression is correct.

What was wrong was the line that came next.

Observation 1.1 (A factor-of-25 error left in the second edition)

The second edition factored the coefficient as

$$\frac{4\pi}{5c^5} = 4\pi \times \frac{5}{c^5} \quad (\text{second edition; wrong})$$

and the same error appeared in the form $P = 4\pi \cdot \left(\frac{c^5}{5}\right)^{-1} \cdot \ddot{Q}^2 \cdot \left(\frac{c^5}{5}\right)^{-1} = \frac{5}{c^5}$, which is not $\frac{1}{5c^5}$.

Numerically (with c at its SI value):

$\frac{4\pi}{5c^5}$ (the formula’s coefficient; correct)	1.037854×10^{-42}
$4\pi \times \frac{5}{c^5}$ (the second edition’s factorisation)	2.594635×10^{-41}
Ratio	25

The correct factorisation is

$$\frac{4\pi}{5c^5} = 4\pi \times \frac{1}{5} \times c^{-5},$$

a product of **three** factors: 4π , $\frac{1}{5}$ and c^{-5} . The quantity $\frac{5}{c^5}$ does not occur.

The error was repeated in four places (twice in Section 2, once inside the proof, once in Section 5). **The formula itself, as written in the abstract, the scope statement and the conclusion, was correct**, so the conclusions are unaffected. **But since the factorisation was wrong, whatever structure was read off it must be read again.**

2. G and c^5 Cannot Be Separated Inside This Formula

The second edition said that 4π (source) and the powers of c (geometry) separate. **With the factorisation corrected, we test whether that separation holds.**

Theorem 2.1 (The coefficient is one fifth of the reciprocal Planck power)

Writing the Planck power as $P_{\text{Pl}} := c^5/G$,

$$\frac{G}{5c^5} = \frac{1}{5} \cdot \frac{1}{P_{\text{Pl}}}, \quad \text{that is} \quad P = \frac{1}{5} \cdot \frac{\langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle}{P_{\text{Pl}}}.$$

Proof.

$$\frac{G}{5c^5} = \frac{1}{5} \cdot \frac{G}{c^5} = \frac{1}{5} \cdot \left(\frac{c^5}{G} \right)^{-1}.$$

Numerical confirmation: in SI, $P_{\text{Pl}} = c^5/G = 3.628255 \times 10^{52} \text{ W}$, $\frac{G}{5c^5} = 5.512292 \times 10^{-54}$ and $\frac{1}{5P_{\text{Pl}}} = 5.512292 \times 10^{-54}$: exactly equal.

Observation 2.1 (G never appears alone)

In the quadrupole formula, G and c^5 occur **only in the single combination G/c^5** . And that combination has a **name: the reciprocal of the Planck power**.

This weakens the second edition's reading that source and geometry separate. They appeared to separate only because 4π and c^{-5} were written out separately *after* the substitution; **in the original formula the two are one**.

3. The Substitution Therefore Reveals No Structure

Observation 3.1 (The patch rescales the whole formula uniformly)

Setting $G = a$ makes the coefficient $\frac{a}{5c^5}$. Computing the ratio to the true value gives exactly a/G (verified here):

a	Coefficient $a/(5c^5)$	Ratio to the true value, a/G
$G = 6.6743 \times 10^{-11}$	5.512292×10^{-54}	1
4π	1.037854×10^{-42}	1.8828×10^{11}
1	8.258981×10^{-44}	1.4983×10^{10}
7.3	6.029056×10^{-43}	1.0937×10^{11}

That the ratio is proportional to a means the substitution rescales the whole formula uniformly. No factor of 4π emerged from within the structure.

As Paper 116 showed, the patch constant may be any $a > 0$. Choosing 4π is a convention, not a fact (Paper 95). The reading that “a solid angle appears” does not follow from this formula.

Observation 3.2 (A substitution is a choice of units, not a discovery)

Setting $G = 4\pi$ is a choice of unit system. In that system c does not carry its SI value either, so the numbers in the table above are a test of “what happens if G alone is moved while c is held at its SI value”, not physical quantities in the patch system.

What the test showed is one thing: however a is chosen, only the overall scale changes, and the bond between G and c^5 does not come undone.

4. The Two 5s Have Different Origins

The second edition reached this verdict. The third edition adds the checks.

The 5 of c^5 : dimensional analysis

Matching dimensions in $P = G^1 c^N \langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle$ with $[P] = ML^2 T^{-3}$, $[G] = L^3 M^{-1} T^{-2}$ and $[\ddot{Q}]^2 = (ML^2 T^{-3})^2$:

Dimension	Equation	Solution
Length L	$3 + N + 4 = 2$	$N = -5$
Time T	$-2 - N - 6 = -3$	$N = -5$
Mass M	$-1 + 2 = 1$	(fixes the power of G at 1; consistent)

Both the length equation and the time equation give $N = -5$ (verified here). It is a value fixed uniquely by dimensional analysis, not a count of spatial dimensions.

The 5 of $\frac{1}{5}$: an angular average over the sphere

The 5 in the denominator arises from an angular average in the derivation. Integrating over the full solid angle produces the tensor average

$$\langle n_i n_j n_k n_l \rangle = \frac{1}{15} (\delta_{ij} \delta_{kl} + \delta_{ik} \delta_{jl} + \delta_{il} \delta_{jk}),$$

whose contractions yield the fractions $\frac{2}{15}$, $\frac{1}{5}$ and so on.

Numerical verification: 4×10^6 points uniform on the unit sphere, fourth moments compared against the formula.

Component	Monte Carlo	Theory
$\langle n_1^4 \rangle$	0.199902	$1/5 = 0.200000$
$\langle n_1^2 n_2^2 \rangle$	0.066651	$1/15 = 0.066667$
$\langle n_1^3 n_2 \rangle$	0.000087	0

The maximum deviation over the six components tested was 9.8×10^{-5} . The $\frac{1}{5}$ is a consequence of averaging over a sphere and has nothing to do with a number of dimensions.

The 5 of c^5 and the 5 of $\frac{1}{5}$ are two 5s of different origin.

5. Updating the Relation to Paper 34

The second edition correctly recorded that the derivation in Paper 34 (obtaining $c^5/5$ from $\int E^2 dc$) had been retracted. **That verdict is kept.**

However, the second edition still cited Paper 34 under its retracted title: “5D Dimensional Leakage Theory: Unpacking $(16\pi^2/5)c^5$ and the Randall–Sundrum Bulk”. What that title names is precisely what was retracted.

Established Fact 5.1 (Paper 34, 3rd ed.: a census of the c^5 s)

The third edition of Paper 34 holds a roll-call of the c^5 s appearing in this series, records that **the 5 and the $\frac{1}{5}$ of the quadrupole formula are distinct roots**, and concludes that **the c^5 of the Planck power, of the quadrupole formula and of the Planck time all fold into the single root c^5/G .**

This third edition is the quadrupole instance of that census. As Theorem 2.1 showed, the coefficient of the quadrupole formula is $\frac{1}{5P_{\text{Pl}}}$: **it has the Planck power itself in the denominator.**

Observation 5.1 (On the direction of dependence (the second edition’s verdict is kept))

The $\frac{G}{5c^5}$ of the quadrupole formula is **determined independently by general relativity and needs no grounding in another paper.** The second edition was right to correct that direction, and **the third edition keeps it.** **What this edition adds is only that the genuine coefficient has a name:** one fifth of the reciprocal Planck power.

6. The Scope, Restated

Item	What it is
$P = \frac{G}{5c^5} \langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle$	Established fact (Einstein 1918; not altered here)
$\frac{G}{5c^5} = \frac{1}{5P_{\text{Pl}}}$	Identity (a rewriting of definitions; verified)
The expression with $G = 4\pi$ substituted	Convention (any $a > 0$ will do; Papers 116, 95)
That 4π separates out of the structure	Not shown (the substitution is a uniform rescaling)
The 5 of c^5	Consequence of dimensional analysis ($N = -5$ uniquely)
The 5 of $\frac{1}{5}$	Consequence of an angular average ($\langle n^4 \rangle = 1/5$)
That 5 is a spatial dimension	Not shown (retracted in the second edition; not reinstated)
New physics of gravitational waves	None (the formula itself is unaltered)

Of the eight rows, not one carries a claim proper to this paper. There is one established formula, one identity, one convention, and the rest are “not shown”.

This is not a shrinking but an addressing (Paper 17).

7. Conclusion

This paper carried one line: the quadrupole formula with $G = 4\pi$ substituted. **That line is correct.**

What changed is what can be read off it. G and c^5 **could not be separated**: together they form one quantity, **the reciprocal of the Planck power**, and the substitution **merely rescaled the whole of it uniformly**. No 4π emerged from within the structure.

And **the two 5s still have different origins**: one is fixed by dimensional analysis, the other by an average over a sphere.

The substitution fits on one line. But what that line revealed could only be read once the factorisation was corrected.

What is not claimed (restraint): the exponent 5 is not read as a count of spatial dimensions (dimensional analysis and an angular average; retracted in the second edition) / **4π is not called a forced value** (any patch constant will do; Papers 116, 95) / **a substitution is not called a discovery** (it is a rewriting following from a choice of units) / **the reading that 4π separates out on the source side is not asserted for this formula** (G and c^5 are one) / **Randall–Sundrum and extra dimensions are not touched** (that reading was retracted and is not reinstated) / **the quadrupole formula itself is not altered** / **the Planck power is not read as a physical upper bound or maximum luminosity** (that is a separate discussion, not treated here) / **Layer-3 lenses (the “cosmic OS” and the like) are kept out of the body** (quarantined under a non-scientific label) / no new mathematics and no prediction (Layer 2).

Revision Record

Third edition (August 2026): neither the quadrupole formula nor the substituted expression $P = \frac{4\pi}{5c^5} \langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle$ is altered. What is added is a correction and an addressing. (i) **An arithmetic correction:** the second edition factored the coefficient as $\frac{4\pi}{5c^5} = 4\pi \times \frac{5}{c^5}$, and also wrote $P = 4\pi \cdot (\frac{c^5}{5})^{-1} \cdot \ddot{Q}^2$, but $(\frac{c^5}{5})^{-1} = \frac{5}{c^5}$ is not $\frac{1}{5c^5}$, and the two differ by a factor of 25 (1.037854×10^{-42} against 2.594635×10^{-41}). The correct factorisation is $4\pi \times \frac{1}{5} \times c^{-5}$. The error was repeated in four places, but the formula as written in the abstract, the scope statement and the conclusion was correct, so the conclusions are unaffected. The square on the right was also made explicit as the tensor contraction $\langle \ddot{Q}_{ij} \ddot{Q}_{ij} \rangle$. (ii) It was shown that G and c^5 occur only in the single combination G/c^5 , and that this is the reciprocal of the Planck power $P_{Pl} = c^5/G = 3.628255 \times 10^{52} \text{ W}$ ($\frac{G}{5c^5} = \frac{1}{5P_{Pl}} = 5.512292 \times 10^{-54}$, numerically exact). (iii) It follows that the substitution reveals no structure: the ratio to the true value on setting $G = a$ is exactly a/G , a uniform rescaling of the whole formula. The second edition’s reading that “ 4π (source) and the powers of c (geometry) separate” is accordingly weakened for this formula. (iv) **Numerical checks** were supplied for the second edition’s verdict that the two 5s are distinct roots: dimensional analysis gives $N = -5$ from both the length and the time equation, and the angular average $\langle n_i n_j n_k n_l \rangle = \frac{1}{15} (\delta\delta + \delta\delta + \delta\delta)$ was verified by Monte Carlo over four million points with a maximum deviation of 9.8×10^{-5} . (v) The citation to Paper 34 was updated from its retracted title to the third edition, connecting to that census’s finding that the quadrupole c^5 folds into the single root c^5/G . (vi) **Layer-3 vocabulary** (the “cosmic OS”, “uncompressed data”) was removed from the introduction. Items retracted in the second edition (the correspondence with Paper 34’s “5D bulk capacity”, reading the exponent 5 as a dimension, and the reference to the Randall–Sundrum bulk) are not reinstated.

The dashes used as separators in the text were replaced by punctuation (October 2026). No claim, number or reference was changed.

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