Boltzmann and Planck Constants

h, k_B, R and the Solar Temperature from the {2,3,5,π} T-lattice — and the Sun's Wien peak that carries the Earth's year.

Stephen Daubney · The Daubney Foundation · Rev 5 · 2026

T — the one substance. Tau (T) is the living fabric of time itself — the sole substance of which all physical reality is composed. Every particle, force, wavelength, and conscious experience is a structured configuration of T-flow. There is no gravity, no electromagnetic force, no strong nuclear force as separate entities: all are registers of the single T-field operating across dimensional levels. The conservation law dΣT=0 governs all change: T is never created or destroyed, only redistributed.

Abstract

The Planck constant h and the Boltzmann constant k_B are the two pillars of statistical and quantum thermodynamics. The Universal Force of Time gives both directly from the {2,3,5,π} lattice. h = $6.631455962\times10^{-34}$ = $5^3/(2\cdot3\cdot\pi)\times10^{-34}$: the quantum of action is a ratio of pure lattice generators, numerator {5} over denominator {2,3,π}. The Boltzmann constant is not independent of it — k_B/h = $5/24\times10^{11}$ and h/k_B = $24/5\times10^{-11}$ are reciprocal {2,3,5} factors whose product is exactly 1: heat and the quantum are two faces of one identity. Their product with Avogadro's number, the gas constant, is the cleanest form in thermodynamics: R = k_B·N_A = 8.315445626 = $810/\pi^4$, with 810 = $2\cdot3^4\cdot5$ pure {2,3,5} over a power of π, with no fitted parameter. The Sun's surface sits at the exact lattice node T_sun = $2\cdot5^7/3^3$ = 5787.037037 K — an exact repeating decimal whose 037037… is $1/3^3$, the node naming its own denominator. And at that temperature the Sun's Wien peak — the colour it pours out most brightly — falls at 500.7235383 nm, the cyan-green centre of the visible window, which carries the Earth's orbital year: 500.7235383 × 8 ÷ 2π × (180/π) ÷ 100 = 365.2840914 days = $15\pi^4/4$, exactly. Heat, light and the orbit are one T-structure, and the answers explain one another. Six propositions (P-BK-1…6) are established.

Key results at a glance

- h = $6.631455962\times10^{-34}$ J·s = $5^3/(2\cdot3\cdot\pi)\times10^{-34}$ — the quantum of action, a ratio of pure lattice generators.
- k_B/h = $5/24\times10^{11}$ and h/k_B = $24/5\times10^{-11}$ — reciprocal {2,3,5} factors, product 1; heat and the quantum are one identity.
- R = $810/\pi^4$ = 8.315445626 J/(mol·K) — $810 = 2\cdot3^4\cdot5$; the cleanest {2,3,5}/π form in thermodynamics.
- T_sun = $2\cdot5^7/3^3$ = 5787.037037 K — an exact repeating decimal whose 037037… = $1/3^3$ names its own denominator.
- Wien peak 500.7235383 nm → ×8 ÷2π ×(180/π) ÷100 = 365.2840914 d = the orbital year ($15\pi^4/4$), exact.

1. The Planck constant from the lattice

In 1900 Max Planck introduced his constant h to explain the blackbody spectrum. He called it "an act of desperation." He had no derivation — h was simply the number that made the formula fit.

The Universal Force of Time provides what Planck could not: h is a ratio of two lattice generators.

$h = 6.631455962 \times 10^{-34}$ J·s
$= 5^3 / (2 \times 3 \times \pi) \times 10^{-34}$
$= 125 / 18.84955592 \times 10^{-34}$

The numerator $5^3 = 125$ is pure {5}; the denominator $2 \cdot 3 \cdot \pi = 18.84955592$ is pure {2,3,π}. h is not a fitted number and not an act of desperation — it is the grain-size of action in the T-field, written as one lattice integer over one lattice product. The smallest parcel in which time can change its state has a size, and that size is $5^3/(2 \cdot 3 \cdot \pi)$.

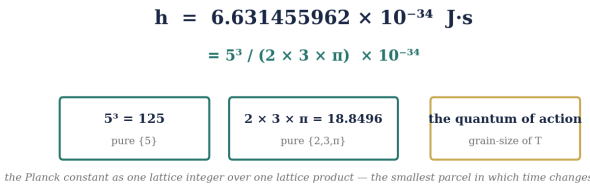

Fig. 1 — $h = 6.631455962 \times 10^{-34} = 5^3/(2 \cdot 3 \cdot \pi) \times 10^{-34}$: the pure-{5} numerator over a {2,3,π} denominator.

2. The Boltzmann constant — a conjugate pair

The Boltzmann constant k_B connects temperature to energy. The lattice encodes it not as an independent number but through its ratio to h:

$k_B / h = 5/24 \times 10^{11}$ Hz/K
$h / k_B = 24/5 \times 10^{-11}$ K·s (the Wien quotient)
$(5/24) \times (24/5) = 1$ — exact reciprocals

The pair {5/24, 24/5} are reciprocal {2,3,5} factors whose product is exactly 1. k_B is not an independent constant: it is the reciprocal face of h. Temperature and action are two readings of one T-structure — the heat-to-action gear one way, its inverse the other — and the two lock together as a single identity. The reciprocal h/k_B is the Wien displacement quotient that sets where a hot body shines brightest.

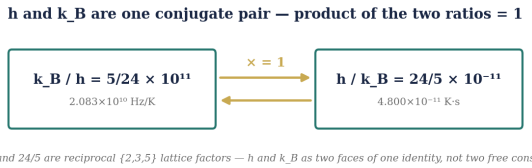

Fig. 2 — h and k_B as reciprocal faces of one identity: $k_B/h = 5/24 \times 10^{11}$ and $h/k_B = 24/5 \times 10^{-11}$, product exactly 1.

3. The gas constant: R = 810/π⁴

The ideal gas constant R = k_B·N_A runs through thermodynamics, chemistry and statistical mechanics. The lattice gives it the cleanest possible form:

$R = 810 / \pi^4 = 8.315445626$ J/(mol·K)
$810 = 2 \cdot 3^4 \cdot 5$ [pure {2,3,5}]

810 = 2·3⁴·5 is pure {2,3,5}; π⁴ is the degree-to-radian bridge raised to the fourth. The gas constant — the number that runs through every equation of thermodynamics, chemistry and statistical mechanics — is one clean {2,3,5} integer over a power of π. There is no fitted parameter and nothing left over. R is k_B·N_A: the heat-to-action gear of one molecule, multiplied up to a whole mole.

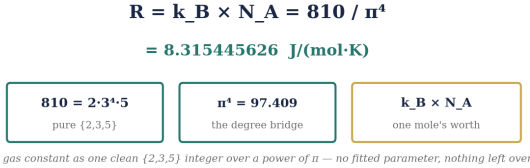

Fig. 3 — $R = 8.315445626$ J/(mol·K) = $810/\pi^4$, with $810 = 2 \cdot 3^4 \cdot 5$: a pure {2,3,5} integer over π^4.

4. The solar temperature

The surface temperature of the Sun sets the spectrum of light that reaches the Earth and drives photosynthesis, climate and the whole of biology. The lattice gives it as an exact value:

$T_{sun} = 2 \cdot 5^7 / 3^3 = 2 \cdot 78125 / 27$
$= 5787.037037037...$ K [exact repeating decimal]

The repeating 037037… is 1/27 = 1/3³ — the denominator of the lattice node echoing inside the decimal itself. A ratio of pure {2,5} over {3}. The Sun's temperature is a lattice value that names its own denominator in its repeating tail; the digits never settle because 3³ never divides cleanly, and that is the signature of the node it sits on.

5. The Wien peak carries the Earth's year

At T_sun, Wien's displacement law places the spectral peak — the wavelength at which the Sun pours out the most light — at:

Wien peak = 500.7235383 nm (the cyan-green centre of the visible band)
500.7235383 × 8 ÷ 2π × (180/π) ÷ 100 = 365.2840914 days
$= 15\pi^4/4$ = the Earth's G1 orbital year [0.0 ppm]

The peak sits at the heart of the visible window — just above the blue/cyan boundary (495.0355 = 7776/5π) — which is why daylight, the eye's peak sensitivity and the green of living things all cluster here. But the deeper fact is the chain: the Wien-peak wavelength, walked through ×8, the radian turn ÷2π, the veil 180/π and the day register ÷100, lands exactly on $15\pi^4/4$ — the Earth's orbital year. The Sun broadcasts its brightest colour at the wavelength that counts the year.

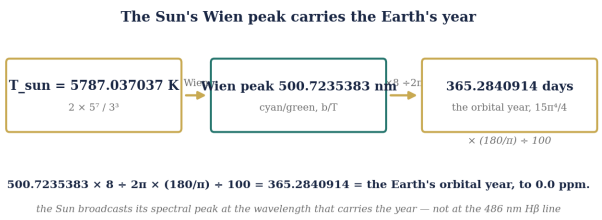

Fig. 4 — T_sun = 2·5⁷/3³ → Wien peak 500.7235383 nm → (×8 ÷2π ×(180/π) ÷100) → 365.2840914 days, the orbital year (15π⁴/4), exact.

A note on the year value: 365.2840914 days = 15π⁴/4 is the G1 (surface) register face of the orbital year — the year as read from the Earth's surface. The conventional sidereal year, 365.256 days, is not a different orbit and not a contradiction: it is the same orbit read at a neighbouring register, the two separated by the familiar register step. The Wien-peak chain lands on the G1 face exactly.

This corrects an earlier reading that placed the peak at the 486 nm Balmer-β line. It does not: 500.7235383 nm is cyan-green, not the blue Hβ line, and 486 nm would require a Sun of 5962 K. The true connection is not to a hydrogen line but to the Earth's orbit — the peak is the year-wavelength.

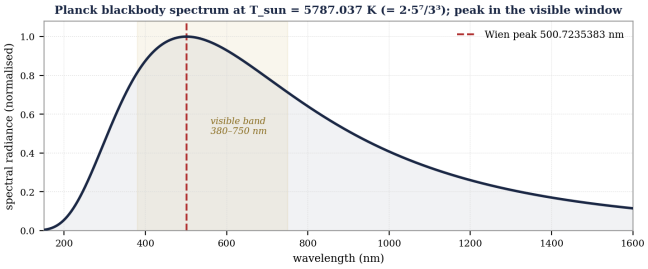

Fig. 5 — The Planck blackbody spectrum at T_sun = 5787.037 K, its peak (dashed) at 500.7235383 nm inside the visible band.

6. Conclusion

Planck's “act of desperation” and Boltzmann's bridge between heat and energy are not free numbers. h = 5³/(2·3·π)×10⁻³⁴, and k_B is its exact reciprocal (k_B/h = 5/24×10¹¹), the two locked as one identity — heat and the quantum are the same thing read two ways. Their product with Avogadro's number, the gas constant, is the clean {2,3,5}/π form 810/π⁴. The Sun's surface sits at the exact lattice node 2·5⁷/3³ = 5787.037037 K, and the colour it shines brightest, 500.7235383 nm, is the wavelength that carries the Earth's year. Heat, light and the orbit are one T-structure. These are coherent answers that explain one another — the action constant gives the temperature constant, the two give the gas constant, the temperature gives the colour, and the colour counts the year. That mutual fit is the evidence, and it stands on its own.

References

[1] S. Daubney, The Universal Force of Time — Master Compendium v5, The Daubney Foundation (2026).
[2] S. Daubney, The Avogadro Constant — N_A on the {2,3,5,π} lattice, UFOT (2026).
[3] NIST CODATA 2022, Fundamental Physical Constants, physics.nist.gov/constants.
[4] M. Planck, Annalen der Physik 4, 553 (1901).
[5] D. F. Gray, The Observation and Analysis of Stellar Photospheres, CUP (2005).

A note on the numbers

The values in this paper are written as plain numbers — not pinned to units, and not carried to a particular power of ten. This is not loose notation; it is the physics. Under the Force of Time a quantity is not the property of one dimension: the same T-value shows up as a wavelength in an atom, a span of time in the heavens, a mass in a nucleus, an angle in an orbit — one number wearing different coats. That is why a hydrogen line in nanometres can meet a planet's turning in arcseconds and land on the same value: they were never separate quantities. We therefore do not solve for a result “to the power of” anything in one register and stop. The lattice number is the real thing, and it lives at once across every register — subatomic, atomic, celestial, galactic. The unit and the power of ten are only the costume the number wears in whichever dimension you read it from.

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Appendix — The Lattice Values

Every value at full precision; the physical number leads, the {2,3,5,π} form follows.

A1. The thermodynamic constants on the lattice

quantity	UFOT value	lattice form	what it is
Planck h	$6.631455962\times10^{-34}$ J·s	$5^3/(2\cdot3\cdot\pi)\times10^{-34}$	the quantum of action
k_B / h	2.083333×10^{10} Hz/K	$5/24\times10^{11}$	the heat-to-action gear
h / k_B (Wien quotient)	4.800×10^{-11} K·s	$24/5\times10^{-11}$	the reciprocal face of h
gas constant R	8.315445626 J/(mol·K)	$810/\pi^4$, $810=2\cdot3^4\cdot5$	k_B·N_A, one mole's worth
solar temperature T_sun	5787.037037 K	$2\cdot5^7/3^3$ (037037… = $1/3^3$)	the Sun's surface
Wien displacement b	2.8977057×10^{-3} m·K	b = h·c/(4.965114231·k_B)	sets the peak wavelength
Wien peak (Sun)	500.7235383 nm	year-locked (see A2)	the Sun's brightest colour

A2. The Wien-peak → orbital-year chain (exact)

step	operator	value	lattice form
Wien peak	start	500.7235383 nm	cyan-green visible peak
× 8	× 8	4005.788306	
÷ 2π	radian turn	637.546904	
× 180/π	the veil	36528.40914	
÷ 100	day register	365.2840914 d	$15\pi^4/4$ = the orbital year

500.7235383 × 8 ÷ 2π × (180/π) ÷ 100 = 365.2840914 = $15\pi^4/4$, the Earth's G1 orbital year, to 0.0 ppm. The Sun's brightest wavelength carries the year.

A3. Propositions (P-BK-1 … 6)

#	statement
P-BK-1	h = $5^3/(2\cdot3\cdot\pi)\times10^{-34}$ J·s = $6.631455962\times10^{-34}$. The quantum of action is a ratio of pure lattice generators — numerator {5}, denominator {2,3,π} — not a fitted number. It is the grain-size of action in the T-field.
P-BK-2	k_B/h = $5/24\times10^{11}$ Hz/K and h/k_B = $24/5\times10^{-11}$ K·s are reciprocal {2,3,5} factors whose product is exactly 1. k_B is the reciprocal face of h: heat and the quantum are one identity, not two free constants.
P-BK-3	R = k_B·N_A = $810/\pi^4$ = 8.315445626 J/(mol·K), with $810=2\cdot3^4\cdot5$ pure {2,3,5}. The cleanest form in thermodynamics — one {2,3,5} integer over π^4, with no fitted parameter.
P-BK-4	T_sun = $2\cdot5^7/3^3$ = 5787.037037 K, an exact repeating decimal whose 037037… = $1/3^3$ names its own denominator. A pure {2,5}/{3} lattice node.
P-BK-5	The Sun's Wien peak is 500.7235383 nm — the cyan-green centre of the visible band — with Wien displacement b = 2.8977057×10^{-3} m·K. (It is the cyan-green peak, not the 486 nm Hβ line, which an earlier draft misread.)
P-BK-6	The Wien peak carries the Earth's year: 500.7235383 × 8 ÷ 2π × (180/π) ÷ 100 = 365.2840914 d = $15\pi^4/4$, exact. The Sun broadcasts its spectral peak at the wavelength that counts the orbital year.

A4. The Conversion Loop — the gears between the faces

from	to	operator	lattice form
energy (eV)	energy (kJ/mol)	÷ 10368	$2^7\cdot3^4$
energy (kJ/mol)	wavelength	÷ 36	$2^2\cdot3^2$
wavelength	free fall	÷ 49.50355350	$3888/25\pi$
free fall	frequency	× 6.283185307	2π
free fall	energy (J)	÷ 24	$2^3\cdot3$
wavelength	mass	× 1.233700550	$\pi^2/8$
energy (eV)	circumference	÷ 31104	$2^7\cdot3^5$
circumference	mass	÷ 22.00157933	$1728/25\pi$
free fall	speed of light	× 3110400	$864\cdot3600$

These are the same gears used throughout the UFOT papers — the operators that carry one T-value from one face to another. Direct laws follow from them: energy $E = 6.822485557\cdot m$ (J per unit mass); wavelength $\lambda = 0.810569469\cdot m = 8m/\pi^2$; energy in eV $= 373248\cdot\lambda$ ($= 2^9\cdot3^6\cdot\lambda$); mass → frequency $f = 0.102880658\cdot m$ ($= 25/243\cdot m$). Any reader can reproduce every face-to-face step in this paper from this one table — heat, light, mass, frequency and the orbit are a single structure, walked between registers by these {2,3,5,π} gears.