1 MUSIC AS COHERENCE OPERATOR: FREQUENCIES, TUNING AND RESONANCE WITH THE OBSERVER

From Pythagorean tuning through A=432 and A=440 to coherently-optimal tuning

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1.1 ABSTRACT

Within the observer-dependent theory of everything (ODTOE), music is investigated as a *coherence operator* $\hat{O}_{\text{mus}}$ acting on an observer at level $d \sim +3$ (organismal) through resonant synchronization of biological loops (Φ_{heart}, Φ_{breath}, Φ_{neur}). An analysis is conducted of the historical evolution of musical tuning: Pythagorean tuning ($\nu_A \approx 432$ Hz, ratios based on $3/2$), Verdi's "scientific tuning" ($\nu_C = 256$ Hz, $\nu_A = 432$ Hz), and the modern ISO 16 standard ($\nu_A = 440$ Hz, adopted in 1955). A criterion of *coherent optimality* of tuning is introduced: minimizing the mismatch δ (V.1) [8] between note frequencies and the natural frequencies of biological loops.

It is shown that the structural invariants of ODTOE—π [2] and $\phi = (1 + \sqrt{5})/2$ [2, section Vbis]—generate two classes of "preferred" frequencies: π-derivatives (via multiples of 2π) and ϕ-derivatives (via Fibonacci ratios). It is established that $\nu_C = 256 = 2^8$ Hz ($\Rightarrow \nu_A = 432$ Hz in Pythagorean tuning) is closer to ϕ-resonance with biological rhythms ($\nu_{\text{heart}} \approx 1.2$ Hz, $\nu_{\text{alpha}} \approx 10$ Hz) than $\nu_A = 440$ Hz. A *coherent scale* is proposed with $\nu_A = 432$ Hz as the basic recommendation and $\nu_A = 429.6$ Hz ($= 256 \times \phi^2/2^2$) as the theoretical optimum. Limitations and experimental protocols for verification are discussed.

Keywords: musical tuning, A=432, A=440, Pythagorean tuning, equal temperament, resonance, coherence, golden ratio, frequency, heart rate, ODTOE.

1.2 I. INTRODUCTION: MUSIC AS AN OPERATOR

1.2.1 1.1. Why does a theory of everything need music?

According to axiom (A) [1]: $R = \hat{O}(\Psi)$ — reality is constituted by the observation operator. Music is a *sound operator* that modifies the state of the observer $O = (B, A, H)$: it retunes the focus of attention F, changes emotional coherence E, and either reduces or increases σ (internal contradiction). According to [1, D1.1]:

$$B = F^{w_1} \cdot E^{w_2} \cdot (1-\sigma)^{w_3} \cdot \Lambda^{w_4} \tag{I.1}$$

Music that increases E and reduces σ *increases* B — and, by P4 [1], increases $P(E \mid B)$.

Music is not entertainment. Music is a calibrator of the observation operator.

1.2.2 1.2. The central question

If music is an operator acting through frequencies, then *which frequencies* are maximally effective? The answer depends on what these frequencies *resonate with*. And resonance is $\delta \to 0$: coincidence between the imposed and natural frequency [8, formula V.1].

1.3 II. HISTORY OF MUSICAL TUNING: FROM PYTHAGORAS TO ISO

1.3.1 2.1. Pythagorean tuning (VI century BCE)

Pythagoras founded harmony on *simple ratios of whole numbers*: octave = $2/1$, fifth = $3/2$, fourth = $4/3$. All intervals were derived from powers of 2 and 3.

The frequency of the note "A" in the first octave in Pythagorean systems was *not fixed* by standard, but reconstructions yield $\nu_A \approx 420$–436 Hz depending on the initial tone.

Philosophical basis: numbers govern the Universe; the simplest ratios generate harmony; music is audible mathematics.

1.3.2 2.2. "Scientific tuning" and Verdi ($\nu_C = 256$ Hz)

In the XVIII–XIX centuries, several physicists and musicians (Sauveur, 1713; Scheibler, 1834) proposed fixing $\nu_C = 256 = 2^8$ Hz. Reason: at $C = 256$, all octaves of the note "C" are powers of two $(1, 2, 4, 8, \ldots, 128, 256, 512, \ldots)$. This is a "natural" scale: $C_0 = 1$ Hz, $C_1 = 2$ Hz, ..., $C_8 = 256$ Hz. At this setting, $\nu_A \approx 430$–432 Hz (depending on temperament).

Verdi in 1884 sent a letter to the Italian Musical Commission supporting $\nu_A = 432$ Hz as a standard, arguing for the "naturalness" of this tuning for the voice.

1.3.3 2.3. Pitch inflation: the rise of the tuning fork

From the XVII to the XX century, concert pitch rose steadily:

Era	ν_A (Hz)	Context
Baroque (1700)	415	Handel's tuning fork
Mozart (1780)	422	Vienna standard
Verdi (1884)	432	Italian proposal

Era	ν_A (Hz)	Context
Paris Conference (1858)	435	French diapason
London (1939)	440	BSI preliminary standard
ISO 16 (1955)	440	International standard
Modern orchestras	441–445	Berlin Philharmonic: 443

Reasons for the rise: (a) brighter, more "brilliant" sound at higher pitch; (b) competition between orchestras for "brightness"; (c) improvement in metal strings (withstanding greater tension). None of these reasons are related to the biology of the observer.

1.3.4 2.4. Establishment of A=440: the 1939 conference and ISO 1955

In 1939 in London, the International Standardization Conference adopted $\nu_A = 440$ Hz. In 1955, ISO formalized this standard (ISO 16). The choice is *pragmatic*: 440 is a round number, convenient for electronics; a compromise between German (443) and French (435) standards. No biological or acoustic arguments were presented.

1.4 III. BIOLOGICAL LOOPS OF THE OBSERVER: NATURAL FREQUENCIES

1.4.1 3.1. Inventory

Each biological loop Φ_{biol} [8, section I.3] iterates at a characteristic frequency:

Loop	ν (Hz)	Octave multiples ($\times 2^n$)
Circadian rhythm	1.16×10^{-5}	—
Breathing (at rest)	0.2–0.3	—
Heartbeat (at rest)	1.0–1.2	…, 64, 128, 256, 512, …
Schumann frequency (Earth)	7.83	…, 125, 250, 501, …
Alpha brain rhythm	8–13	…, 128, 256, 512, …
Theta rhythm	4–8	…, 64, 128, 256, …
Beta rhythm	13–30	…, 208, 416, 832, …
Gamma rhythm	30–100	…, 480, 960, …

1.4.2 3.2. Resonance criterion

Two oscillators resonate if the ratio of their frequencies is a small integer (or its fraction): $\nu_1/\nu_2 = p/q$, where p, q are small. Ideal resonance: $\nu_1/\nu_2 = 2^n$ (octave multiple). In ODTOE [8, formula V.1]:

$$\delta \to 0 \text{ at octave multiple} \tag{III.1}$$

1.4.3 3.3. Key observation

$\nu_{\text{heart}} \approx 1$ Hz. Octave multiples: $1, 2, 4, 8, 16, 32, 64, 128, 256, 512$. At $\nu_C = 256$ Hz:

$$C_4/\nu_{\text{heart}} = 256/1 = 2^8 \text{ — *exact octave multiple*} \tag{III.2}$$

The note "C" at the tuning $C = 256$ Hz *resonates* with the heart across 8 octaves.

At $\nu_A = 440$: $C_4 = 440 \times 2^{-9/12} \approx 261.6$ Hz. $261.6/1 = 2^n$ — *no octave resonance*.

Schumann frequency: 7.83 Hz. Octave multiples: $\ldots, 125.3, 250.6, 501.1\ldots$. At $C_4 = 256$:

$$256/7.83 \approx 32.7 \text{ — *close to } 2^5 = 32\text{, but not exact*} \tag{III.3}$$

At $C_4 = 261.6$: $261.6/7.83 \approx 33.4$ — farther from 2^5.

Alpha rhythm: 10 Hz. Octave multiples: $\ldots, 160, 320, 640\ldots$. None of the standard notes fall exactly; but $256/8 = 32 = 2^5$ — at lower alpha   8 Hz, octave resonance with $C = 256$ reappears.

1.5 IV. STRUCTURAL INVARIANTS OF ODTOE IN MUSIC

1.5.1 4.1. π and music

According to [2, section III]: π appears in ODTOE as the period of oscillation of the coupled system $R \leftrightarrow B$. A full cycle of self-observation contains a phase of 2π. All wave processes contain 2π in the argument: $\sin(2\pi\nu t)$.

Musical sound is a pressure oscillation:

$$p(t) = p_0 \sin(2\pi\nu t + \varphi) \tag{IV.1}$$

Each note is *one cycle* of 2π, repeating ν times per second. π is already embedded in the very nature of sound — through the cyclic nature of the act of observation [2].

1.5.2 4.2. φ and music: the golden ratio in harmony

According to [2, section V-bis]: $\phi = (1 + \sqrt{5})/2 \approx 1.618$ is a structural invariant of discrete iterative self-referential dynamics. In music, ϕ manifests as:

(a) *Chromatic scale.* 12 semitones in an octave. The ϕ-point of the octave: $2^{\phi/(1+\phi)} = 2^{0.618} \approx 1.535$. Nearest interval: minor sixth ($2^{8/12} = 1.587$). Chords containing a minor sixth are often described as "warm" and "emotionally saturated" — the first inversion power chord.

(b) *Formal structure.* Many composers (Bartók, Debussy, Shostakovich) placed climaxes at the ϕ-point of the work (61.8% of total duration).

(c) *Fibonacci sequence and overtones.* Fibonacci numbers $(1, 1, 2, 3, 5, 8, 13, \ldots)$ appear in the structure of overtones: fundamental tone (1), octave (2), fifth across an octave (3), double octave (4 — not Fibonacci, but 5 = major third across two octaves), 8 = three octaves, 13 ≈ augmented octave.

1.5.3 4.3. φ-derivative frequency

Define the *φ-optimal frequency of the note "A"*:

$$\nu_{A,\phi} = \nu_{\text{heart}} \times 2^n \times \phi^m \tag{IV.2}$$

At $\nu_{\text{heart}} = 1$ Hz, $n = 8$, $m = 0$: $\nu_A = 256 \times (3/2)^{3/4} \approx 432$ (via the Pythagorean ratio C → A).

More precisely: with equal temperament, $\nu_A = \nu_C \times 2^{9/12}$. If $\nu_C = 256$: $\nu_A = 256 \times 2^{3/4} = 256 \times 1.6818 \approx 430.5$ Hz.

Alternative path via ϕ: $\nu_C \times \phi = 256 \times 1.618 = 414.2$ Hz (close to Baroque tuning!).

Or: $\nu_{\text{heart}} \times \phi^{12} = 1 \times 321.997 \approx 322$ Hz (not a standard note, but falls between $E_4 = 329.6$ and $E\ _4 = 311.1$ in modern tuning).

1.5.4 4.4. KAM-stability and tuning

According to [2, V-bis.4]: the Kolmogorov–Arnold–Moser (KAM) theorem establishes that orbits with frequency ratios most distant from rational approximations are *maximally stable*. φ is a number with *worst* rational approximations.

Consequence for music: intervals close to the φ-ratio create *maximally stable* resonances in nonlinear systems (such as the human organism). The interval $\phi = 1.618\ldots$ lies between the fifth ($3/2 = 1.500$) and minor sixth ($2^{8/12} = 1.587$) / major sixth ($2^{9/12} = 1.682$). Major sixth (1.682) is the nearest standard interval to ϕ.

1.6 V. 432 VS 440: QUANTITATIVE ANALYSIS

1.6.1 5.1. Frequency table

Note	ν at A=440 (Hz)	ν at A=432 (Hz)	Δ (Hz)	Δ (cents)
C4	261.63	256.87	−4.76	−32
D4	293.66	288.33	−5.33	−32
E4	329.63	323.63	−6.00	−32
F4	349.23	342.88	−6.35	−32
G4	392.00	384.87	−7.13	−32
A4	440.00	432.00	−8.00	−32
B4	493.88	484.90	−8.98	−32

Note	ν at A=440 (Hz)	ν at A=432 (Hz)	Δ (Hz)	Δ (cents)
C5	523.25	513.74	−9.51	−32

The difference between A=440 and A=432 is *exactly 31.77 cents* (= $1200 \times \log_2(440/432) \approx 31.8$). This is approximately 1/3 of a semitone — audible to a trained ear, but not perceived as "out of tune."

1.6.2 5.2. Octave resonance with biorhythms

At $C = 256.87$ Hz (tuning A=432, equal temperament): $C_4/\nu_{\text{heart}} = 256.87/1.0 \approx 257$ — *close* to $2^8 = 256$, but not exact ($\delta \approx 0.003$).

At precise "scientific" tuning $C = 256.00$ Hz: $C_4/\nu_{\text{heart}} = 256 = 2^8$ *exactly*. $\delta = 0$. Ideal octave resonance.

At $C = 261.63$ Hz (tuning A=440): $C_4/\nu_{\text{heart}} = 261.63$. $261.63/256 = 1.022$ — deviation 2.2% from 2^8. $\delta \approx 0.022$.

1.6.3 5.3. Resonance with the Schumann frequency

$\nu_{\text{Schumann}} = 7.83$ Hz. Five octaves higher: $7.83 \times 2^5 = 250.6$ Hz.

$C = 256$: discrepancy $256/250.6 = 1.022 \to \delta \approx 0.022$.

$C = 261.63$: discrepancy $261.63/250.6 = 1.044 \to \delta \approx 0.043$.

Tuning A=432 is twice closer to Schumann resonance than A=440.

1.6.4 5.4. Summary table of mismatches

Biorhythm	Multiple 2^n	δ at C=256	δ at C=261.6
Heart (1.0 Hz)	$256 = 2^8$	0.000	0.022
Heart (1.2 Hz)	307.2 (not C)	0.167	0.149
Schumann (7.83 Hz)	$250.6 = 7.83 \times 2^5$	0.022	0.043
Alpha rhythm (8 Hz)	$256 = 8 \times 2^5$	0.000	0.022
Alpha rhythm (10 Hz)	$320 = 10 \times 2^5$	0.200	0.182
Theta (6 Hz)	$384 = 6 \times 2^6$	G_4 = 384.87: 0.002	G_4 = 392: 0.021

At C=256, three biorhythms ($\nu_{\text{heart}} = 1$ Hz, $\nu_{\text{alpha}} = 8$ Hz, $\nu_{\text{theta}} \approx 6$ Hz) yield *nearly zero* mismatch with the scale notes. At C=261.6, the mismatch is *systematically higher*.

1.7 VI. COHERENTLY-OPTIMAL TUNING: RECOMMENDATIONS

1.7.1 6.1. Level 1: Minimal correction (A=432)

Recommendation: transition from A=440 to A=432 Hz.

Justification: $C_4 \approx 256.9$ Hz — practically exact octave resonance with $\nu_{\text{heart}} = 1$ Hz and $\nu_{\text{alpha}} = 8$ Hz. Minimal deviation from familiar tuning (−32 cents = −1.8%). Historically justified (Verdi, Pythagorean tradition). Technically feasible (electronic retuning).

1.7.2 6.2. Level 2: Precise scientific tuning ($C = 256$ Hz, $A \approx 430.5$)

Recommendation: $\nu_C = 256.00$ Hz exactly, $\nu_A = 256 \times 2^{9/12} = 430.54$ Hz.

Justification: *exact* octave resonance $C/\nu_{\text{heart}} = 2^8$. All octaves of the note "C" are powers of two: $C_0 = 1$ Hz, $C_1 = 2, \ldots, C_8 = 256, C_9 = 512$. Note $C_0 = 1$ Hz = *one heartbeat*. Music and biorhythm are *identical* at the fundamental level.

1.7.3 6.3. Level 3: φ-optimal tuning (theoretical)

From the KAM theorem [2, V-bis.4]: maximum stability occurs at φ-frequency ratio. Proposed tuning:

$$\nu_{n+1}/\nu_n = 2^{1/\phi^2} \approx 2^{0.382} \approx 1.306 \tag{VI.1}$$

This is an *unequal* temperament in which the step between notes is determined by φ, not $2^{1/12}$. The octave (×2) is divided not into 12 equal semitones, but into $1/\log_2(2^{1/\phi^2})^{-1} \approx 2.618$ "φ-tones" — a non-integer number, which means a *spiral* structure of the scale instead of a closed octave.

This echoes the *transcendence of* π in ODTOE [2, section IV]: spiral (not circular) observation dynamics. The φ-tuning is a *spiral scale*: it does not close into an octave, but *unwinds*, like the self-observation loop.

Practical feasibility: extremely difficult for traditional instruments; possible on electronic synthesizers. Theoretical interest: maximum KAM-stability of resonance.

1.7.4 6.4. Recommendations table

Level	Tuning	ν_A (Hz)	δ_heart	Feasibility
Current standard	ISO 16	440.0	0.022	Standard
Minimal correction	Verdi	432.0	0.003	Retuning
Scientific precise	C = 256	430.5	0.000	Retuning
φ-optimal	Spiral scale	—	—	Synthesizer

1.8 VII. WHY A=440 "WORKS WORSE": MECHANISM VIA ODTOE

1.8.1 7.1. Mismatch as σ

According to [8, formula V.1]: mismatch $\delta > 0$ between imposed and natural frequency translates into $\sigma > 0$ — internal contradiction. An organism listening to music in A=440 tuning receives $\delta_{\text{heart}} = 0.022$: a small but *nonzero* discrepancy between the musical rhythm and the biological rhythm. According to [1, D1.1]:

$$B = \ldots \times (1 - \sigma)^{w_3} \tag{VII.1}$$

Any $\sigma > 0$ reduces B.

At A=432 (more precisely, $C = 256$): $\delta \to 0$, $\sigma_{\text{rhythm}} \to 0$, $B \to B_{\max}$ (all else being equal).

1.8.2 7.2. Confirmation bias vs. real effect

A skeptic might object: "432 vs 440 is placebo; the difference is inaudible." ODTOE's answer: by P4 [1], placebo *works* ($B > 0 \Rightarrow P(E \mid B) > 0$). But *in addition to* placebo, there exists a *physical* mechanism: octave resonance $256/1 = 2^8$ is a mathematical fact, independent of listener belief. Resonance $\delta = 0$ acts through *biophysics* ($d \sim +2$: cellular, neural), not cognitive belief ($d \sim +3$).

Experiment [7]: choral singing synchronizes HRV. If a comparison were conducted at A=432 vs A=440 (double-blind), ODTOE predicts: HRV synchronization would occur *faster and deeper* at A=432 than at A=440, due to smaller δ.

1.8.3 7.3. Cumulative effect

The difference $\Delta\delta = 0.022$ in a single listening session is small. But music accompanies the observer *continuously*: background music, concerts, instruments, recordings. Cumulative effect over years:

$$\sigma_{\text{cumul}} \sim \int_0^T \delta(t)\, dt \tag{VII.2}$$

If $\delta = 0.022$ is *constant* (all music in A=440), then σ_{cumul} grows linearly — *chronic* mismatch, analogous to circadian shift [8, section V.4].

1.9 VIII. ANCIENT TUNING SYSTEMS AS INTUITIVE COHERENCE

1.9.1 8.1. Indian music: Sa = the voice's fundamental tone

In Indian classical music, there is no fixed ν_A. The fundamental tone (*Sa*) is tuned to the *natural frequency of the singer's voice*. Each musician plays in *their own* tuning. In ODTOE: $\delta = 0$ by definition — the instrument is tuned to the loop of the specific observer.

1.9.2 8.2. Gregorian chant: acoustic resonance with the temple

Gregorian singing was tuned to the resonant frequencies of the space (temple). The tuning was determined by architecture. In ODTOE: temple = an architectural artifact of coherence [5], its resonant frequencies = the natural frequencies of the collective loop of the worshippers. Tuning to the temple = tuning to the collective.

1.9.3 8.3. Tibetan singing bowls: overtone resonance

A singing bowl generates *multiple overtones*, distributed according to φ-like ratios (not exact equal temperament). The observer is immersed in a *nonlinear resonance*, closer to the φ-optimal tuning (VI.1) than any standard instrument.

1.10 IX. SPECIFIC FREQUENCY RECOMMENDATIONS

1.10.1 9.1. Scale of "coherent frequencies" ($C = 256$, $A = 430.5$)

Note	ν (Hz)	Nearest bioresonance
C_0	1.000	Heart (1.0 Hz) — *exact match*
C_1	2.000	Delta rhythm (0.5–4 Hz)
C_2	4.000	Theta boundary (4 Hz)
C_3	8.000	Alpha rhythm (8 Hz) — *exact match*
G_3	191.8	—
C_4	256.00	2^8 — octave resonance with heart
D_4	287.35	—
E_4	322.54	Close to $\varphi^{12} = 322.0$
F_4	341.72	—
G_4	383.57	$6 \times 2^6 = 384$ — theta × 2^6
A_4	430.54	Tuning fork
B_4	483.26	—
C_5	512.00	2^9 — double octave resonance

Four notes (C_0, C_3, C_4, C_5) give *exact* match with biorhythms. G_4 is nearly exact ($\delta \approx 0.001$). Five of twelve notes in the first octave are in resonance.

1.10.2 9.2. Transition from current tuning

Parameter	Current (A=440)	Recommended (C=256)	Change
ν_A	440.00 Hz	430.54 Hz	−9.46 Hz (−2.2%)
ν_C	261.63 Hz	256.00 Hz	−5.63 Hz (−2.2%)
Intervals	Unchanged	Unchanged	0
Temperament	Equal	Equal	0
Instruments	Unchanged	Retuning	Trivial

The transition is technically elementary: shift *all* notes by −37.6 cents. Intervals, harmony, melody — *unchanged*. Only *absolute pitch* changes, and it changes toward *bioresonance*.

1.11 X. TESTABLE PREDICTIONS

1.11.1 10.1. HRV coherence: A=432 vs A=440

Protocol: two choirs, identical composition, double-blind (conductor unaware of tuning), HRV monitoring of all participants. ODTOE predicts: HRV synchronization at A=432 will occur faster (by 15–30 s) and will be deeper (higher coherence in LF/HF spectrum).

1.11.2 10.2. Alpha rhythm: tone C=256 vs C=262

Protocol: EEG monitoring while listening to pure tones 256 Hz vs 262 Hz (30 s each, randomized). ODTOE predicts: at 256 Hz, alpha rhythm power (8 Hz = 256 / 2^5) will increase significantly more than at 262 Hz.

1.11.3 10.3. Subjective assessment

Double-blind listening to the same composition in A=440 and A=432. Assessment: "relaxation," "emotional engagement," "sense of harmony." ODTOE predicts: systematic preference for A=432 on parameters related to E (emotion) and σ (internal contradiction).

1.12 XI. DISCUSSION

1.12.1 11.1. What ODTOE adds to the debate

The "432 vs 440" debate has lasted decades, but arguments usually amount to subjective preferences or numerology. ODTOE offers a *formal apparatus*: (a) resonance criterion δ [8, formula V.1]; (b) mechanism $\delta \to \sigma \to B \downarrow$ [1, D1.1]; (c) collective effect via P5 [1]; (d) testable predictions (section X).

1.12.2 11.2. What ODTOE does not claim

(a) "432 is a magic number." No: 432 is an *approximation* to the optimum $C = 256$ Hz ($A \approx 430.5$). The exact value depends on temperament.

(b) "440 is harmful." No: $\delta = 0.022$ is a small quantity. The effect is cumulative and small compared to other factors (σ from stress, F from screen time).

(c) "Ancients knew better." Partially: intuitive tuning to voice/temple/body is indeed closer to $\delta = 0$ than a fixed electronic standard. But ancient tunings were *unstable* and *irreproducible* — their $S_{\text{tech}} \to 0$.

1.12.3 11.3. Limitations

(a) $\nu_{\text{heart}} = 1.0$ Hz is an idealization; actual rhythm varies (0.8–1.5 Hz), which blurs octave resonance.

(b) The link $\delta \to \sigma$ (section VII.1) is postulated, not strictly derived from axiomatics.

(c) The φ-optimal tuning (VI.1) is a theoretical construct; its perceived "harmoniousness" is not guaranteed (the auditory system is adapted to $2^{1/12}$).

1.13 XII. CONCLUSION

Music is a coherence operator $\hat{O}_{\text{mus}}$ calibrating the observer's B through resonance of note frequencies with biological loop frequencies (Φ_{heart}, Φ_{alpha}, Φ_{breath}).

The A=440 standard (ISO 16, 1955) was chosen on *technological*, not *biological* grounds. It produces $\delta = 0.022$ with heart rhythm — a small but chronic mismatch.

The tuning $C = 256$ Hz ($A \approx 430.5$ Hz) provides *exact octave resonance* $C/\nu_{\text{heart}} = 2^8$ and $C/\nu_{\text{alpha}} = 2^5$. The A=432 Hz tuning (Verdi) is a practical approximation with $\delta \approx 0.003$.

ODTOE's recommendation: *retuning to* $C = 256$ ($A \approx 430.5$) — a minimal correction (−2.2%), preserving all intervals and harmonies, but bringing music into *bioresonance* with the observer.

$C_0 = 1$ Hz $= 1$ heartbeat.

Music begins with the heart — literally.

1.14 CONFLICT OF INTEREST

The author has no conflict of interest.

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