The Senses on the Ladder

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The Vacuum.Net Theory and the investigation and restoration of human perception

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Summary

A sense is a structure that closes on one ring of a single ladder; the human has named senses on a few rings, an unnamed band of eighteen rings between warmth and hearing, and measured responses already lie inside that band. This document derives that statement from the first distinction of the Vacuum.Net Theory, shows how to use it to investigate the senses and to restore them with vibration, and states plainly what vibration cannot restore. Every number has been recomputed; every external finding is cited with its source and its weaknesses.

The theory in one paragraph. There is one strand. A distinction is the strand returning to a place it has been. Every return carries one of three values, −1, 0 or +1, whose sum is zero. Only what closes in a window of three persists; what does not close stays as tension or passes on, whole, to the next scale. A ring of three equal steps closes and becomes one step of the scale above. Two ladders, ×2 and ×3, never meet exactly; their best near-meetings are the closure depths 1, 2, 5, 12, 41, 53, 306, … Everything below follows from these rules.

The ladder in physical units. Fixing one length and one time by hydrogen ($S_o = 4.5588 \times 10^{-8}$ m, $T_o = 1.5207 \times 10^{-16}$ s) turns the ring number into a measurable depth: $n = \log_3(\text{measure} / \text{unit})$. Without anything about the human being put in, the human body falls at space depth 15.9 (ring 16 = 1.96 m) and a human life at time depth 52.9, next to the closure depth 53 (93.4 years).

Perceiving. Perceiving is closure, not image-making. A sense closes with whatever arrives in its own window. Visible light runs from ring 2 (410 nm, a closure depth) to ring 2.5 (√3 × 410 nm = 711 nm): half a ring that starts on a closure depth.

The map of the senses.

Window	Rings	Status
Vision	2 – 2.5	named sense
Body warmth (thermal infrared)	5, a closure depth	named sense
Rings 6 – 23 (9 THz down to 70 kHz)	18 rings	no named sense
Microwave hearing, measured	13.3 – 15.8 (rings 14, 15)	measured response inside the empty band
Whole-body radio-frequency resonance, measured	16.7 – 17.3 (ring 17)	measured absorption inside the empty band
Hearing	24 – 30	named sense

Window	Rings	Status
Brain response to geomagnetic rotation, measured	alpha band 30.8 – 31.3 (ring 31)	measured, without awareness
Heartbeat, breath	33 – 35	inner sense
Rest cycle	41, a closure depth	inner rhythm

Acting on a sense. Four rules follow from the theory. Read the state first, because the response of the medium depends on it. Offer the window of the layer itself, because only equal windows close. Offer it as a nested triad f, f/3, f/9, because a window of three at one ring is one step of the ring above. Use a rotating three-phase signal to close locally and three equal pulses to carry the closure one layer up. Leave silence after each offering, because drift is repaired only where nothing flows. Recomputed: offering single stimuli and letting a ring of tissue settle by itself leaves 98.8 to 100 % of open rings of length 5 to 10 cycling without rest; the complete window must be offered.

What vibration can and cannot restore. It can retune what has drifted within its class. It cannot bring back what has jumped class (dead cells, cut structure), it cannot act where throughflow is missing, and it cannot remove the remainder that every life leaves open (0.21 % at depth 53).

Vision worked out. The window of the eye opens at closure depth 2 and runs through rings 3 (1231 nm) and 4 (3693 nm) to closure depth 5 (11.08 µm), the warmth of the body. The derived offering for a drifting retina is a rotating three-phase signal at 410 / 1231 / 3693 nm, closed with warmth at 11.08 µm, followed by silence, in sessions of 92 minutes (closure depth 41).

Status. The arithmetic is proved or computed. That human steps and tissues are trits is a correspondence of the theory. The location of measured windows on rings is an approximate observation. The existence of a sense at closure depth 12 (12.4 GHz) is the central untested prediction. Nothing in this document is medical advice.

Part I. The Vacuum.Net Theory from the first distinction

The theory rests on one ground (the trinity), five axioms (N1–N5) and theorems derived from them; this part states all that the rest of the document uses, so that the reader needs no other text. Theorem numbers refer to *The Vacuum.Net Theory: Foundations*, version 9.2, and *Physics*, version 9.0 (Konstapel 2026a, 2026b).

1. The first distinction

Spencer-Brown's *Laws of Form* opens with one instruction: draw a distinction. A mark splits a space into an inside and an outside, and two laws govern marks: calling twice is calling once; crossing twice is not crossing. A mark that contains itself (re-entry) cannot settle on marked or unmarked; it alternates. Kauffman reads that alternation as the iterant [+1, −1] with a time shift, and shows that it squares to −1: the imaginary unit is the oscillation of a self-referring distinction.

The theory states the same act in the language of a strand.

- **N1 (Strand).** There is exactly one strand. Every distinction is a loop: the strand returning to a place it has been.

A place visited at least twice is a node. Everything that exists, from a particle to a society, is in this reading a pattern of returns of one strand.

2. Direction and the trinity

- **N3 (Memory).** At every node the passages are ordered. The first passage fixes the direction; later passages are taken relative to it. The net carries its history as its shape.

The trit rule makes N3 mechanical. A later passage through a node receives **+1** if it leaves the node the way the first passage left it, **−1** if it leaves the way the first passage came in, and **0** otherwise. The three values −1, 0, +1 sum to zero; this is the trinity, the ground beneath the axioms.

The trits are digits of balanced ternary and add by the digit rule (T1). A sum s keeps its balanced residue $d \in \{-1, 0, +1\}$, with $d \equiv s \pmod 3$, at its own scale and passes the rest, $(s - d)/3$, whole, to the next scale as carry. The residues form $\mathbb{Z}_3$, the smallest cyclic group in which a value differs from its reverse.

Balanced ternary needs no minus sign (negation is mirroring, $1 \leftrightarrow -1$), multiplies single digits without carry, and rounds automatically when cut (the discarded tail is at most half the last kept unit). Shifting a word one place multiplies or divides by three: the same word at another depth.

3. The window of three

- **N2 (Closure).** A loop persists if and only if it lies in a closed window. What does not close passes on as tension. Closure is the selection rule; there is no external selector.

A run of equal nonzero trits first leaves no residue at length three, so a window is three consecutive trits (T2). It closes when its sum is 0 mod 3. Of the 27 possible windows, 9 close (T3): the 3 whose trits are all equal and the 6 whose trits are all different (T4). The 18 open windows all have exactly two equal trits. This is also the rule of Fox three-colouring at a knot crossing.

4. Three elementary closures and what they carry

Every closed trit word reduces to nothing by removing, one at a time, three kinds of piece (T7):

Closure	Form	Digit kept	Carry to the next scale
Standing	0	0	0
Meeting	x, −x	0	0
Ring	x, x, x	0	±1
Open window (two equal)	for example 1, 1	−1	1

A meeting is the shortest closure with winding number 0, a ring the shortest with winding number ±1. A standing and a meeting close with nothing passed upward. A ring closes at its own scale and becomes **one passage of the next scale**: 1 + 1 + 1 = 10 in balanced ternary (T7.1). An open window keeps a nonzero digit as tension and may also carry: 1 + 1 = 1T. These four lines are the arithmetic of everything that follows.

- **N5 (Scale).** Merged into blocks, the coarse strand obeys N1 to N4 again. What does not close at one scale is the material of the next.

5. What closes everywhere, and what does not

A word closes in every window only if its first window closes and it has period three; for every length there are exactly 9 such words (T8). A ring of trits that closes in every window repeats every third trit (T9).

The rewrite of the register, $R(t)_i = -(t_{i-1} + t_{i+1})$, sets each trit from its two neighbours; since $2 \equiv -1 \pmod 3$, each trit becomes the mean of its neighbours in $\mathbb{Z}_3$. A ring is a fixed point of R exactly when every window closes (T10). These fixed points are the eigenforms of the register: forms that reproduce themselves.

Recomputed for this document over all rings of length 3 to 10:

Ring length	Already closed (fixed)	Reach rest under R	Keep cycling
3	9	0	18 (66.7 %)
4	3	24	54 (66.7 %)
5	3	0	240 (98.8 %)
6	9	0	720 (98.8 %)
7	3	0	2,184 (99.9 %)
8	3	24	6,534 (99.6 %)
9	9	0	19,674 (99.95 %)
10	3	0	59,046 (99.99 %)

A ring left to its neighbours almost never comes to rest. This single computation decides much of Part VI.

6. Seams

A seam joins a closed window A to a closed window B. The number of open windows at the seam is $[A_1 \neq B_1] + [A_3 \neq B_3]$: only the first and last trits count, because the middle of a closed window is fixed by them, being −(first + last). The seam closes if and only if B = A (T11). Over all 81 ordered pairs, 9 seams close, 36 have one open window and 36 have two (recomputed). Two different closed configurations cannot be joined without tension.

7. The address

Every integer has exactly one balanced-ternary word (T12). The address of −Q is the mirror of the address of Q. Words of k digits cover exactly the integers from $-(3^k - 1)/2$ to $(3^k - 1)/2$; the capacities 1, 4, 13, 40, 121, … are the all-ones words. A closed configuration read without a starting point is a rotation class; their number is the necklace count g(n) = 3, 6, 11, 24, 51, 130 for n = 1 to 6 (T13). Identity, in this reading, is membership of a class.

8. Two ladders and the comma

Merging meetings doubles, merging rings triples (T15). The ladders ×2 and ×3 never meet exactly, because $2^n \neq 3^k$ for all n, k other than zero (T16). Their best near-meetings are the denominators of the convergents of $\log_2 3 = [1; 1, 1, 2, 2, 3, 1, 5, 2, 23, 2, 2, 1, 1, 55, \ldots]$, recomputed here (T17):

$$\text{closure depths} = 1,\ 2,\ 5,\ 12,\ 41,\ 53,\ 306,\ 665,\ 15601,\ \dots$$

The miss never vanishes. At depth 12 it is the Pythagorean comma, $3^{12}/2^{19} = 1.013643$, or 23.46 cents (T18). At depth 53 it is $2^{84}/3^{53} = 0.997914$, a remainder of 0.2086 %, or 3.615 cents. The same numbers are the best equal temperaments of music: 12, 41 and 53 divisions of the octave tune the fifth to within 1.955, 0.484 and 0.068 cents.

9. The first knot and conserved charge

Embedded in three-dimensional space, three crossings are the least that cannot be undone; the trefoil is the first knot, and it exists in a left and a right form (T19, T20). Its three-colouring obeys the window rule of T4. A strand attached to its surroundings returns to its initial state after a rotation of 4π, not 2π (T21). The Hopf charge is conserved under every continuous rewrite and can change only by cutting the strand (T22).

10. Coupling and context

- **N4 (Context).** The response of the medium is a state function, not a universal constant. Universality is the limiting case in which the state does not vary across the sample.

Made explicit, the stiffness of the medium depends on its local density: $g_{eff} = \bar{g}(1 + \gamma\delta)$ (T23). The same offering therefore meets a different response in a different state. Every irreversible discharge occurs at a mesh with an address (Physics T6): loss is bookkeeping on the net, not a leak out of it.

11. The bridge to physics

Rowlands' nilpotent form of Dirac's equation, $Q = ikE + ip + jm$, squares to zero exactly on the mass shell $E^2 = p^2 + m^2$ (Physics T1); the theory reads nilpotence as closure. A stable particle is a closed winding; the electron corresponds to light closed on itself in a double loop (Williamson and van der Mark). Maxwell's quaternion equations carry two registers in one product, read as two readings of one closure (Physics II). These are correspondences, not derivations; they are stated so that the reader knows where the ladder touches physics.

Part II. The hydrogen ladder

One length and one time, both fixed by hydrogen, turn every ring of the theory into a measurable depth in metres and seconds; nothing about the human body or its senses is used to fix them.

1. The units

The model is dimensionless; its quantities are ratios. For comparison with instruments, Physics 9.0 (III.2) fixes the conversion by hydrogen with its reduced mass, using CODATA 2018 values: $R_\infty = 10{,}973{,}731.568160\ \text{m}^{-1}$, $m_p/m_e = 1{,}836.15267343$, $c = 299{,}792{,}458$ m/s.

Unit	Definition	Value
R_H	$R_\infty / (1 + m_e/m_p)$	$10{,}967{,}758.340\ \text{m}^{-1}$
S_o	$1 / (2R_H)$	$4.55881671 \times 10^{-8}$ m
T_o	S_o / c	$1.52065757 \times 10^{-16}$ s

Unit	Definition	Value
E_o	h / T_o	27.1966 eV, the Hartree energy of hydrogen with its reduced mass

On the ring ladder (T15 with only ring merges) the layer at depth n has length $3^n \cdot S_o$ and time $3^n \cdot T_o$. At ring 2 the length is $9S_o$ = 410.29 nm, the Balmer Hδ line of hydrogen; this holds by construction of S_o and is a consistency of the unit, not an independent agreement.

2. The depth rule

The depth of anything with a length L or a period t follows directly:

$$n = \log_3\!\left(\frac{L}{S_0}\right) \qquad\text{or}\qquad n = \log_3\!\left(\frac{t}{T_0}\right)$$

For electromagnetic waves the two coincide, because $T_o = S_o/c$: a wave at time depth n has its wavelength at space depth n. For sound and for bodily rhythms only the time depth applies, since their speed is not c.

3. The ring table

All values recomputed from S_o and T_o.

Ring n	Length $3^n \cdot S_o$	Period $3^n \cdot T_o$	Frequency	What lies there
1 (closure depth)	136.8 nm	0.456 fs	2.19 PHz	ultraviolet
2 (closure depth)	410.3 nm	1.37 fs	731 THz	violet edge of vision
2.5	710.6 nm	2.37 fs	422 THz	red edge of vision
3	1,230.9 nm	4.11 fs	244 THz	near infrared
4	3,692.6 nm	12.3 fs	81.2 THz	mid infrared
5 (closure depth)	11.08 µm	37.0 fs	27.1 THz	thermal infrared of the body (Wien peak at 37 °C: 9.35 µm)
12 (closure depth)	2.42 cm	80.8 ps	12.4 GHz	microwave
14	21.8 cm	0.727 ns	1.37 GHz	microwave
15	65.4 cm	2.18 ns	458 MHz	ultra-high frequency
16	1.96 m	6.54 ns	153 MHz	length of the human body
17	5.89 m	19.6 ns	50.9 MHz	very high frequency
24		42.9 µs	23.3 kHz	upper edge of hearing
27		1.16 ms	862 Hz	voice
29		10.4 ms	95.8 Hz	voice, low

Ring n	Length $3^n \cdot S_o$	Period $3^n \cdot T_o$	Frequency	What lies there
30		31.3 ms	31.9 Hz	lower edge of hearing, felt vibration
31		93.9 ms	10.65 Hz	centre of the alpha band of the brain
33		0.845 s	1.18 Hz	heartbeat, 71 per minute
35		7.61 s	0.131 Hz	slow breathing, 7.9 per minute
41 (closure depth)		92.4 min		sleep and rest cycle
43.5		1 day		inner clock
48.9		1 year		
53 (closure depth)		93.4 years		human life
70.1	1.32×10^{26} m	$1/H_o$		the universe, c/H_o with $H_o = 70$ km s^{-1} Mpc^{-1}

The column "what lies there" is observation; the rings are arithmetic. The reader can check every row with a calculator and the two units above.

4. Why closure depths matter

At a closure depth the ladders ×2 and ×3 come closest. A configuration there closes both as a meeting (×2) and as a ring (×3), so closure is strongest there and the remainder smallest. Four closure depths fall inside the human range of time and space: 2 (the start of vision), 5 (the warmth of the body), 41 (the rest cycle) and 53 (the length of a life). A fifth, 12, falls in the band where the human has no named sense (Part V).

Part III. From closure to life to the human

The human is the deepest knot whose own repair still goes round; on the hydrogen ladder it occupies one ring in space (16) and twenty rings in time (33 to 53). This part follows Konstapel (2026c), *The Topology of Life: The Human as Knot*, and connects it to the axioms.

1. A thing is a pattern, not material

A thing is a pattern of contacts that keeps returning. The strand running through it is replaced continuously; the pattern is not. That nearly every molecule of a body is exchanged within a few years while the person remains is, in a theory that starts from matter, a puzzle about continuity. Here it is the definition of a thing.

2. Life

A contact across which no tension difference stands is not laid again and falls away (N2). No pattern persists by being left alone; whatever lasts, lasts because it lays itself again faster than it comes apart.

> *Life is a closure that lays itself again as long as something flows through it.*

Three consequences follow. Life is not an exception added to matter; it is the only way anything lasts. Holding together is itself the work: when throughflow falls to zero, nothing is laid and the pattern drains. And life sits between two ways of not existing: too little throughflow, and complete closing, where every boundary has been taken inward and nothing flows. The second looks like perfect stability and is death. A living whole keeps part of its boundary open.

3. Depth

Knotting knots into one lays contacts across their members; each such contact uses up an open contact on both members and makes them inner. The new knot has less boundary than its members had together. That is all that closing is: taking boundary inward (N5). How long a thing stands without input is its content divided by how open its boundary is; closing keeps the content and reduces the openness, so a knot of knots always lasts longer than its parts. Molecule, cell and human are one construction at three depths.

4. The ceiling

Repair does not run everywhere at once; it has to go round the pattern, and part of every newly laid contact lands beside the pattern and must be set back in the phases when nothing flows. Above some size a pattern loses contacts faster than repair returns them. The tower of closures is therefore finite and short.

> *The human is the deepest knot whose repair still goes round.*

5. Form and identity

Two knots of equal depth differ in form: which contacts, in which order, crossing which way. A new knot is laid on the strand of two existing knots under the tension of that moment, and the first passage fixes the direction (N3). Origin and moment are one form, and that form is who someone is. A pattern belongs to a class or does not; identity changes only by a jump of class. What looks gradual is drift within the class, which can build up for a long time and then turn over at once.

6. What depth yields

- **All cycles at once.** A shallow knot runs one cycle; a human runs many at once, at tempos that differ by fixed factors, from fractions of a second to decades. That is what an inner life is.
- **Perceiving is contact.** A pattern from outside runs along the knot's own contacts and stands inside as a state. There is no intermediate step in which an image is made.
- **Acting is offering.** A knot sets a disturbance into the net; what fits comes back, the rest drifts away. There is no pushing.
- **Rest is layered.** Drift is corrected only where nothing flows, and every layer needs its own phases of rest, at its own tempo.

7. Where the human sits

With the depth rule of Part II and nothing about the human put in:

Object	Measure	Depth
Cell	10 µm	space 4.9, next to closure depth 5
Human body	1.7 m	space 15.9 (ring 16 = 1.96 m)
Heartbeat	1 s	time 33.2
Generation	25 years	time 51.8
Human life	80 years	time 52.9, next to closure depth 53 (93.4 years)

Four findings follow. The human is one ring in space and twenty in time, from the heartbeat at 33 to the life at 53: many cycles through one closure. The cell lies at closure depth 5 and the life at closure depth 53. A life is a near-closure: at depth 53 the two ladders miss by 0.21 %, and because 2^n never equals 3^k, that remainder never vanishes. The next closure depth, 306, lies at 4.8×10^{122} years, far beyond the time scale of the universe (time depth 70.1): the human is the last near-closure before the ladder runs empty.

Part IV. What perceiving is

Perceiving is a seam that closes: the pattern that arrives and the window of the receiving structure become one closure when their windows are equal, and what does not fit is not perceived. This part derives that reading and tests it on vision.

1. The usual account and the account of the theory

The usual account has three stages: a stimulus arrives, an organ forms a representation, and the brain builds a picture from it. The theory has no stage at which a picture is made.

1. **Arrival is a seam.** The arriving wave is the strand reaching a knot. Where the pattern of the wave has the same window as the receiving structure, B = A, the seam closes (T11). That closure is the perception. Outside and inside are, for that moment, one closure.
2. **What does not fit is not perceived.** A seam between different windows carries one or two open windows. What does not close stays as tension or passes on (N2). Perception is not a camera that records everything; it is the set of closures a given window can make.
3. **Perception climbs.** A ring that closes is one passage of the scale above (T7.1). A closed window at the sense organ passes upward through the layers of the body to the reading layer in the brain. Perceiving is a closure through the whole stack, not an event in the organ alone.
4. **Perception comes in counts of three.** A closure needs a window of three passages (T2). Perception proceeds in steps, not as a continuous film.

2. Vision on the ladder

Visible light is conventionally given as about 400 to 700 nm. On the ladder (recomputed):

Wavelength	Depth
400 nm	1.98
410.3 nm	2.00, ring 2, a closure depth
555 nm	2.27

Wavelength	Depth
700 nm	2.49
710.6 nm	2.50, ring 2.5 = √3 × ring 2

The violet edge of vision falls on ring 2, a closure depth; the red edge falls on ring 2.5, the geometric midpoint between ring 2 and ring 3. Vision is half a ring that starts on a closure depth. This is a numerical observation on the ladder; the edges of human vision vary between persons and with intensity, so the agreement is a correspondence, not a proof.

Above ring 2 the stack continues: ring 3 at 1,231 nm, ring 4 at 3,693 nm, and ring 5 at 11.08 µm, the closure depth of the warmth of the body. In the theory, the window of the eye and the warmth of the body are one stack of four rings.

3. What the account explains

- **Two people see different things in the same scene.** Their windows differ, so different seams close.
- **Blind people who learn echolocation or image-to-sound devices come to orient by sound.** The same reading layer closes, reached through another depth (sound lies on rings 24 to 30). Seeing, in this account, is a closure in the reading layer, not a property of light.
- **Perception without awareness.** A closure can occur on a layer that feeling does not register, because feeling runs on a faster layer than the one that closes (Part III, 6). Part V gives a measured case.

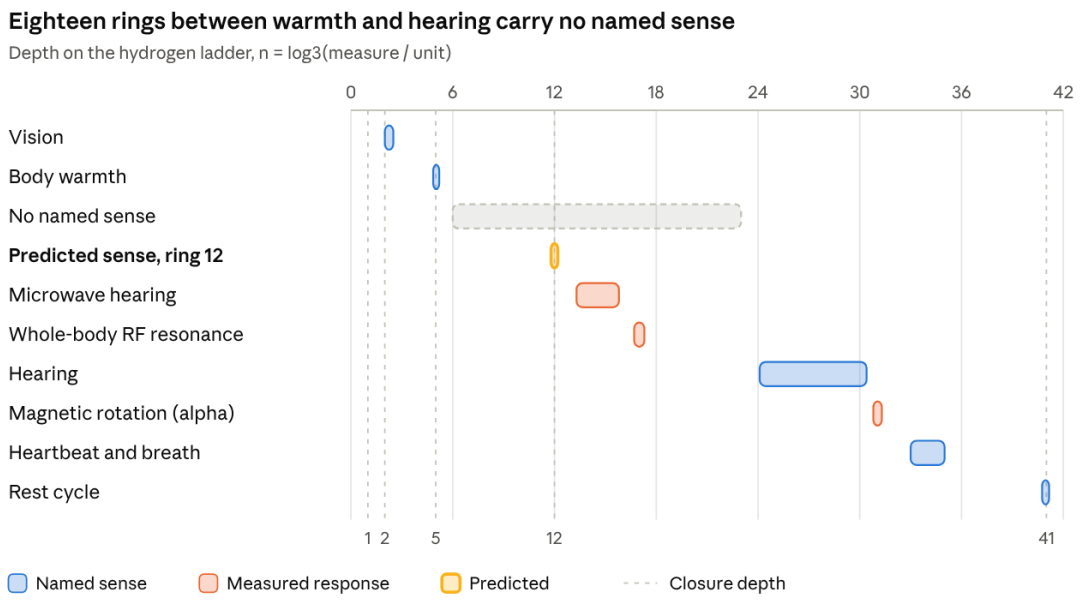
4. A sense, defined

> *A sense is a structure that closes with whatever arrives in its own window, at its own depth on the ladder.*

Two consequences follow at once. Every ring of the ladder is a possible window; and the human, running many rings at once, may close on rings for which there is no named organ. Part V maps them.

Part V. The map of the senses on the ladder

The named human senses occupy a few rings; between warmth (ring 5) and hearing (ring 24) lies a band of eighteen rings without a named sense, and three measured human responses already fall inside or at the edge of the ladder's unnamed places.



senses on the hydrogen ladder · rings 0–42

Read from left to right: vision and warmth at the bottom of the ladder, hearing and the body's rhythms at the top, and between them a band of eighteen rings where only measured responses and one prediction stand.

1. The named windows

Window	Measured range	Depth	Ring(s)
Vision	400 – 700 nm	1.98 – 2.49	2 to 2.5
Warmth, thermal infrared	body emission peak 9.35 µm at 37 °C	4.85	5, a closure depth
Hearing	20 Hz – 20 kHz	24.1 – 30.4	24 to 30
Felt vibration	lower end of hearing and below	about 30 – 32	30 to 32
Heartbeat, breath (inner senses)	1 s, 2.5 – 7.6 s	33 – 35	33 to 35
Rest cycle	about 90 min (70 – 110 min)	about 41	41, a closure depth
Inner clock	1 day	43.5	

2. The empty band

Rings 6 to 23 (wavelengths from 33 µm to 4.3 km, frequencies from 9 THz down to 70 kHz) carry no named human sense. In the theory every ring is a possible window, so the band is not empty of windows, only of names. Two places in it are singled out by the ladder:

- **Ring 12, closure depth, 12.4 GHz (2.42 cm).** Closure is strongest at a closure depth. If any unnamed sense exists in the band, the ladder places it most probably here.
- **The body's own scale.** The body is 1.7 m long, space depth 15.9. A body of that length couples to electromagnetic waves near its own scale, so the body as a whole is a candidate window in the upper teens of the ladder.

3. Measured windows inside the band

Three measured human responses lie on the ladder at the places named above or next to them (depths recomputed from the published ranges).

Measured response	Published range	Depth	Rings inside the range	Source
Microwave hearing: pulsed microwaves heard as clicks or buzzing	about 200 MHz – 3 GHz	13.3 – 15.8	14 (1.37 GHz), 15 (458 MHz)	Frey 1962; Foster and Finch 1974; Lin 1978
Whole-body resonance: peak absorption when body length ≈ 0.4 wavelength	70 MHz (free), 35 MHz (grounded), adult of 1.75 m	16.7 – 17.3	17 (50.9 MHz)	RF dosimetry handbook (IFAC-CNR)
Brain response to rotation of an Earth-strength magnetic field, without awareness	response in the alpha band, 8 – 13 Hz	30.8 – 31.3	31 (10.65 Hz)	Wang et al. 2019

Three remarks keep the reading honest.

1. **Microwave hearing** is explained in the literature by a thermoelastic mechanism: each pulse heats brain tissue slightly, and the pressure wave reaches the cochlea through the skull (Foster and Finch 1974). In the theory that is not an alternative but a route: the closure arrives at ring 14–15 and is passed up to the hearing layer. The test is whether thresholds are lower on rings 14 and 15 than between them.
2. **Whole-body resonance** is absorption, not perception. It shows that the body has an electromagnetic window near its own scale. The body's own length lies at space depth 15.9; the resonance lies at 16.7 to 17.3, because a conducting body resonates when its length is about 0.4 of the wavelength, and $\log_3(2.5) = 0.83$. Whether absorption at ring 17 produces any perception is open.
3. **Magnetoreception** was measured in 36 adults at Caltech: downward-directed counterclockwise rotations of a field of about 35 μT produced a drop in alpha power (alpha event-related desynchronization), about three times larger than for clockwise rotations; participants could not tell whether the field had changed (Wang et al. 2019). In the theory this is a closure on a layer that feeling does not register, and its response lies on ring 31, whose frequency, 10.65 Hz, is the centre of the alpha band.

4. The light of cells

At the bottom of the ladder, cells emit ultra-weak light. The mitogenetic experiments of Gurwitsch (onion roots, ultraviolet, 1920s) and the distant cell-culture interactions of Kaznacheev (1960s–1980s) place this emission at depths 1.3 to 1.8 (190 to 340 nm), between closure depths 1 and 2. Part VI reads those experiments through the rules.

5. What the map predicts

- A human response exists at ring 12 (12.4 GHz) that is stronger than at rings 11 and 13.
- Microwave hearing thresholds are lowest on rings 14 and 15.
- The magnetoreceptive response is strongest when the field rotation is offered at ring 31 (10.65 Hz) or at the nested triad 10.65 / 3.55 / 1.18 Hz.
- People differ in which rings close for them. What is called "paranormal" perception is, in this reading, closure on a ring for which there is no named organ. This last point is a reading, not a measurement.

Part VI. How a wave acts on a structure

A wave changes a structure only by closing with it: it must arrive in the structure's own window, at the structure's depth, in a state of the structure that is open to it; the Russian field-medicine record, read through these rules, shows exactly this pattern, including its notorious irreproducibility.

1. Derivation

1. **A wave** is a return that repeats: a periodic trit word.
2. **A persistent wave** closes in every window; it has period three and is one of nine words: a constant run, or one cyclic order of (−1, 0, +1) (T8).
3. **A structure** is a closed ring at a depth. Each element takes the value set by its two neighbours; what closes everywhere stays (T10).
4. **Wave meets structure** at a seam. It closes only if the windows are equal, B = A (T11). Then the wave confirms the closure. If B ≠ A, one or two open windows put tension into the structure, which stays as residue or passes one scale up.
5. **Depth.** A wave acts on the ring where its period lies; one step is a factor of three.
6. **State.** The response of the medium is a state function (N4). The same wave meets a different response in a different state.

2. The rules for acting on a structure

Rule	From	In practice
Read first	N4	Measure the state of the layer before offering anything.
Same window	T11	Offer the layer's own healthy rhythm, on the layer's own ring.
Three nested	T2, T7.1	Offer a nested triad: f, f/3, f/9. A window of three at ring n is one passage at ring n + 1.
Local or carried	T7	A rotating three-phase signal (0°, 120°, 240°) is the order (+1, 0, −1): it closes with carry 0 and stays local. Three equal pulses are a ring: carry 1, passed one layer up.
Offer the whole window	T10, recomputed	Single stimuli leave 98.8 % to 100 % of open rings of length 5 to 10 cycling without rest. The complete closed window must be offered at once.
Silence after	Part III, 6	Drift is repaired only where nothing flows: after each offering, at least one period of the ring above in silence.

3. The Russian record, read through the rules

The author's review *Russian Field Medicine* (Konstapel and Trommelen 2025) gathers a century of work on non-chemical influence between living systems. Two independent reviews give the numbers (Volodyaev and Beloussov 2015; Scholkmann, Fels and Cifra 2013).

Observation	Reported	Reading in the theory
Gurwitsch, onion roots (1920s): the tip of one root aimed at the division zone of a second root	Share of cells in mitosis on the exposed side 65.60 % against 47.50 % on the opposite side (ratio 1.38); only through quartz, not through glass	T10 and T7.1. The neighbour sets the next passage of the cell. Division is a ring that closes and passes one passage up.
Kaznacheev, two cultures coupled only optically (1960s–1980s): a virus or toxin applied to one culture	The receiving culture showed the same damage in 72 % of 170 trials, after about 2.3 days of contact; strongest between cultures of the same species	T11, B = A. The receiver takes over the window of the sender. Same species means same first and last trit, so the seam closes most easily. Influence by copying the window.

Observation	Reported	Reading in the theory
Quartz passes, glass blocks	Quartz and thin water layers transmit the factor, thick glass does not	The seam needs an open path at the depth of the wave (190 – 340 nm, depth 1.3 – 1.8).
Irreproducibility	Effects described as capricious; a negative yeast study is attributed to receivers in the wrong growth phase; Kaznacheev reports August as the best month; Wainwright et al. saw the effect in 2 of 7 experiments	N4. The same signal closes only with a receiver whose state is open to it. Irreproducibility is what the theory predicts when state is not read first.
SCENAR, biofeedback stimulation (Karasev, 1970s)	The signal adapts to the measured tissue response	A device that searches by measurement for B = A.
Space medicine, reduced magnetic field	Bone, muscle and other processes are disturbed when the background field is reduced	N4. A different background is a different stiffness of the medium, so a different closure.

Both reviews state the same limits: the ultraviolet component of ultra-weak emission is real, its biological effects are hard to reproduce, statistics and control of confounders are insufficient, and no formal independent replication of Kaznacheev's specific results is described. The theory does not remove these limits; it explains why they arise and how an experiment must be designed to avoid them: read the receiver's state, offer the complete window, and record the state with every result.

4. A vibroacoustic device on the ladder

The Vitafon (St. Petersburg) delivers mechanical microvibrations through skin contact. A rat study gives its settings (Sjecr 2014); recomputed depths:

Setting	Value	Time depth	Nearest ring
Low carrier	30 – 60 Hz	30.1 – 29.4	30 (31.9 Hz), 29 (95.8 Hz)
Most used in vibroacoustic therapy	40 Hz	29.8	between rings
High carrier	9 – 18 kHz	24.9 – 24.2	25 (7.76 kHz), 24 (23.3 kHz)
Impulse modulation	0.5 – 1.2 s	32.5 – 33.3	33 (0.845 s, heartbeat)
Frequency sweep	80 – 160 s	37.1 – 37.8	37 (68 s), 38 (205 s)
Session	60 min	40.6	41 (92.4 min)

The modulation sits on the heartbeat ring, where closure with a rhythm already running in the body is easiest. The carriers lie between rings. The sweep is a search that passes through depths until the window happens to match, which, by N4, explains why such devices help some people and not others. The evidence base agrees with that reading: the rat study had six animals per group, one significant blood-pressure change and one changed marker of four; a scoping review of vibroacoustic therapy for pain (most often at 40 Hz) calls the evidence weak and mixed (BMJ Open 2022).

The theory proposes a three-arm test on the same device: (a) standard 40 Hz for 60 minutes; (b) carrier on ring 30 (31.9 Hz), modulation on ring 33, session of 92 minutes; (c) carrier and modulation set to the person's own measured heart and breath rhythms. Predicted order of effect: (c) strongest and least variable, then (b), then (a).

Part VII. Restoring a sense

Vibration can retune a sense that has drifted within its class, can let living neighbours fill a gap, and can open another route to the same reading layer; it cannot bring back what has jumped class, act where throughflow is missing, or remove the remainder that every life leaves. Vision is worked out in full as the example.

1. What illness of a sense is

In the theory, a sense is a stack of closures from the organ to the reading layer. A sense fails when one layer of that stack no longer closes. Two cases must be kept apart:

- **Drift.** The structure of the layer is still there, but it no longer closes on its own ring. Drift stays within the class (Part III, 5) and can be retuned.
- **Jump of class.** The structure is gone: cells have died, a path is cut. A continuous rewrite cannot restore a cut strand (T22). This cannot be retuned.

2. The five layers of vision

The author's analysis of blindness divides vision into five layers, each broken by different causes (Konstapel 2026d): passage (cornea, lens), window (photoreceptors and pigment epithelium), edge (bipolar and ganglion cells, optic nerve), relay (thalamus), and reading ring (visual cortex). In the ladder, the window layer opens at ring 2 and the stack runs through rings 3 and 4 to ring 5.

Layer	Typical failure	Drift or jump	What the rules allow
0. Passage	Clouded lens, misshaped cornea or eye	Material change of the medium	Not a vibration task; the passage is replaced or corrected optically.
1. Window	Photoreceptors failing (inherited dystrophies, macular degeneration)	Drift while cells live; jump when they die	Retune while alive; fill from living neighbours; otherwise a new window.
2. Edge	Ganglion cells and optic nerve failing (glaucoma)	Drift while cells live, partly a throughflow problem; jump when they die	Restore throughflow; retune while alive.
3. Relay	Damage in the thalamic pathway		Reached through training, as layer 4.
4. Reading ring	Cortical damage	Often drift of a reachable layer	Retune by repeated offering; open another route.

3. The derived offering for the window layer

Step	What	Why
1. Read	Measure how the window layer responds to light at 410 nm (ring 2)	N4: state first
2. Retune (cells alive, drifting)	Rotating three-phase signal at 410 / 1,231 / 3,693 nm	Nested triad on rings 2, 3, 4; order (+1, 0, −1), carry 0, closes in place
3. Fill a gap (cells lost, same-kind neighbours alive)	Three equal pulses at 410 nm on the living neighbours	A ring passes carry 1: one new passage into the gap; elements are set by their neighbours (T10)
4. Close the stack	Warmth at 11.08 µm	Closure depth 5 closes the stack of four rings
5. Silence	At least one period of the ring above	Drift is repaired only where nothing flows
6. Session length	92.4 minutes	Closure depth 41

Two statements here are new. The offering is not one colour but a stack of three wavelengths, each three times the previous, ending in the warmth of the body. And a single stimulus is not enough: the recomputation of Part I, 5 shows that open rings left to their neighbours nearly always keep cycling, so the complete window must be offered at once.

Safety comes first: light into the eye, at any of these wavelengths, must be tested for safety at low intensity before any other test. This section is a research design.

4. The edge layer and throughflow

Life is a closure that lays itself again as long as something flows through it (Part III, 2). In the edge layer the clinical record already shows the weight of throughflow: in the author's compilation, a 25 % reduction of eye pressure halved the progression of glaucoma, and each 1 mmHg of reduction lowered risk by about 10 % (Konstapel 2026d). In the theory that is the restoration of the condition for laying again; vibration can add the window only where the throughflow is there.

5. Another route to the reading layer

Where the window and edge layers are lost, the reading layer can be reached through a layer that is still open. Sound lies on rings 24 to 30, far from light at ring 2, yet it closes in the same reading layer. In the author's compilation: ten weeks of echolocation training cut the time blind participants needed in a maze by 58 %; a device that renders images on the tongue let 69 % of year-long users pass an object-recognition test; daily training of the blind field after cortical damage raised task accuracy from about 50 % to about 80 % (Konstapel 2026d). In the theory these are closures in the reading layer reached through another depth, and repeated offering that retunes a drifting layer.

6. The four limits

1. **Nothing settles by itself.** Recomputed: under the rewrite R, 98.8 to 100 % of open rings of length 5 to 10 keep cycling. Stimulation that leaves the tissue to find its own closure will seldom succeed. The window must be offered complete.

2. **What has jumped class does not return through vibration.** Identity changes only by a jump of class; charge changes only by cutting (T22). Vibration is continuous. Lost structure needs a new strand: a new lens, a new window, a new path.
3. **Without throughflow nothing is laid again.** Vibration supplies the window, not the material and not the energy.
4. **The remainder of life stays.** At closure depth 53 a remainder of 0.21 % always stays open, because $2^n \neq 3^k$ (T16). It can be tempered and spread over the cycles, but not removed.

7. For a general reader

The body is an orchestra of rhythms. A sense falls ill when one instrument goes out of tune, slowly, without notice, until it is heard. Vibration can retune an instrument that is out of tune, provided one first listens which one it is, gives the tone of that instrument and not one tone for all, and lets it rest afterwards. Vibration cannot rebuild an instrument that is broken, cannot make an orchestra play that has no food, sleep or rest, and cannot keep anyone in perfect tune for ever.

Part VIII. Research programme

Six tests decide the claims of this document; each states its prediction, its measurement and what would refute it, and each names the research groups best placed to run it.

1. The tests

Test	Prediction	Measurement	Refuted if
T-A. A sense at ring 12	A human response to 12.4 GHz exposure is larger than to 4.1 GHz (ring 13) and 37 GHz (ring 11) at equal absorbed power	Alpha event-related desynchronization, as in Wang et al. 2019, double blind with sham	No difference between rings 11, 12 and 13
T-B. Microwave hearing on rings	Thresholds are lowest at 1.37 GHz (ring 14) and 458 MHz (ring 15)	Detection threshold across 200 MHz – 3 GHz in fine steps, thermoelastic dose held equal	Thresholds follow absorption only, with no minima at the rings
T-C. Magnetoreception and ring 31	The response is larger when the field rotation is modulated at 10.65 Hz, or as the triad 10.65 / 3.55 / 1.18 Hz	Alpha response, Caltech protocol	No difference from unmodulated rotation
T-D. Nested triad versus single tone	Vibration at the person's own ring with the triad f, f/3, f/9 brings the body rhythm into phase more often than a single tone or an off-ring tone	Phase locking of heartbeat and breath; three-arm design of Part VI, 4	No difference between arms
T-E. State first	Effects in the Gurwitsch and Kaznacheev paradigms become reproducible when the receiver's state (growth phase) is fixed in advance	Mitotic index of receivers, quartz versus glass, state recorded	Variance does not fall when state is fixed
T-F. The eye stack	In retinal tissue models, the triad 410 / 1,231 / 3,693 nm closed with 11.08 µm preserves function longer than 410 nm alone at equal energy	Electroretinogram in tissue or animal models, after safety testing	No difference

Every test is pre-registered: the rings, thresholds and decision rules are fixed before data are seen.

2. Who can run them

Group	Why	Fits test
Joseph L. Kirschvink and Shinsuke Shimojo (Caltech), with Connie X. Wang	Built the protocol that measures a human response without awareness	T-A, T-C
James C. Lin (University of Illinois Chicago)	The standard reference on microwave auditory effects	T-B
Kenneth R. Foster (University of Pennsylvania)	Explained microwave hearing thermoelastically; the right critic for designs that must exclude ordinary explanations	T-A, T-B
Michal Cifra (Institute of Photonics and Electronics, Czech Academy of Sciences, Prague)	Bioelectrodynamics and ultra-weak photon emission	T-E, T-F
Eduard van Wijk and Ilya Volodyaev	Editors of the standard work on ultra-weak photon emission; Volodyaev co-authored the review of the mitogenetic effect	T-E
Felix Scholkmann (Zurich)	Co-author of the review of non-chemical cell-to-cell communication	T-E
RF dosimetry groups	Body-resonance models and exposure control	T-A, T-B

The names are those of authors whose published work is cited here; their participation is not implied.

3. What would count as strong evidence

A single positive result at ring 12, replicated by an independent group under pre-registration, would be the strongest evidence this document can ask for, because ring 12 is predicted by the ladder alone and has not been examined by anyone. Agreements already found (vision edges, alpha centre, microwave-hearing band) were found after the fact and can only support, not prove.

Status ledger

Every statement carries one of five statuses; a summary of this document may not change them.

Statement	Status
Digit rule, window of three, 9 of 27, elementary closures and carry, seam rule, unique address, closure depths, comma (Foundations T1–T18)	Proved or conditionally proved, recomputed
98.8 – 100 % of open rings of length 5 – 10 keep cycling under R	Computed, exhaustive
Hydrogen units, ring table, depths of every measured quantity	Computed from CODATA 2018 inputs

Statement	Status
Human body at space depth 15.9, life at time depth 52.9 next to closure depth 53	Computed; nothing about the human put in
Violet edge of vision at ring 2, red edge at ring 2.5	Computed agreement; correspondence
Life as closure that lays itself again; the human as deepest knot whose repair goes round	Derived reading (N2, N5), Konstapel 2026c
Perceiving is closure at a seam; a sense is a structure closing on its ring	Derived reading (T7.1, T11)
Human passages, tissues and rhythms are trits	Correspondence (Physics C6; Foundations IX.5 open)
Measured windows: microwave hearing 13.3 – 15.8, body resonance 16.7 – 17.3, alpha response 30.8 – 31.3	Measured by others; depths computed; placement on rings approximate
Gurwitsch and Kaznacheev effects	Reported; reviews call them real but hard to reproduce; no formal independent replication of Kaznacheev described
Rules for acting on a structure (read first, same window, nested triad, local or carried, whole window, silence)	Derived
A sense at ring 12	Predicted, untested
Eye stack 410 / 1,231 / 3,693 nm with 11.08 µm	Predicted, untested; safety testing required first
Three-arm vibration test	Predicted, untested
What vibration cannot restore (four limits)	Derived (T10 computation, T16, T22, N2)
Clinical use of any offering in this document	None. Research design only, not medical advice

Annotated references

The theory

- **Konstapel, J. (2026a). *The Vacuum.Net Theory: Foundations*, version 9.2, Ninth Edition, 27 October 2026. constable.blog.** The ground (trinity), the axioms N1–N5 and theorems T1–T24, each with proof and a record of checks. *Why read it: every statement in Part I cites a theorem here; it can be checked with pencil, paper and a short program.*
- **Konstapel, J. (2026b). *The Vacuum.Net Theory: Physics*, version 9.0. constable.blog.** The hydrogen units S_0 and T_0, the nilpotent Dirac operator, Maxwell's two registers, loss with an address (T6), correspondences and predictions. *Why read it: it shows that the units of Part II are fixed by hydrogen, not chosen to fit the human.*
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- **Manchon, D. *Maths & Music #2: Mathematics of keyboard tuning*. CNRS Insmi.** The comma, the wolf fifth and equal temperament. *Why read it: the precedent for tempering a remainder that cannot vanish.*
- **Tiesinga, E. et al. (2021). "CODATA recommended values of the fundamental physical constants: 2018". *Reviews of Modern Physics* 93, 025010.** *Why read it: the inputs of the hydrogen units.*

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rotations of a field of about 35 µT produced alpha event-related desynchronization at electrode Fz, about three times larger for counterclockwise rotations; participants were unaware of the field change. *Why read it: a human response without awareness, centred on ring 31.*

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Vibration devices

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