

Where the Paranormal Comes From

A Context-Dependent Account, Derived from Fractal Context Dynamics

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Statement of what this essay does and does not do

This essay does not argue that anomalous phenomena occur. It derives what they would have to be, given Fractal Context Dynamics (FCD), and shows that the derivation is forced rather than added — that no new entity, force, field, carrier or postulate is introduced anywhere in it. Every element used is already load-bearing in FCD for reasons that have nothing to do with this subject.

That is the strongest available claim, and it is a claim about the structure of an explanation, not about the state of the evidence. The evidential question is treated separately, in §12, and the framework's own criterion is used to sort it.

A reader who rejects FCD may still find the essay useful for one reason: it identifies precisely which inherited commitments make the standard framing of the question unanswerable, and those commitments are independent of FCD.

1. The question is badly posed

Ask what the paranormal is and the reply arrives in a fixed grammatical shape: *someone did something to something at a distance*. What force went from the mind to the object? What signal crossed the gap? What energy was transmitted, and where did it come from?

Three unstated commitments produce that shape.

The first is that nature undergoes rather than acts — that matter is passive and requires an external mover. This is a theological inheritance in which agency was reserved for elsewhere, and it survived the theology that motivated it.

The second is grammatical. Indo-European syntax requires a subject for every predicate, so every process is delivered with an agent attached. This is why the actor migrates from God to law to gene to brain and never disappears: philosophy can remove it and syntax reinstates it. Nietzsche identified the mechanism in a page; Korzybski built a discipline around it; neither was read by the fields that needed them.

The third is that separate things require a signal to make contact. This is the default of every model of communication since Shannon, and it is so deeply held that it is not usually recognised as a claim at all.

Together these three fix the answer before the investigation begins. If matter is passive, something must act on it. If every event has a doer, that doer must be identified. If contact requires a signal, a carrier must be found. The only admissible answer is a new force, and there is no new force. The result is a stalemate that looks empirical and is grammatical.

This is why a research programme aimed at lifting physical prohibitions — on over-unity, on superluminal signalling, on retrocausation — can be internally coherent and still deliver nothing. Lifting a prohibition yields a permission. A permission is not a capacity. The question of what a human being can actually do is untouched by any of it, because the assumptions doing the real work lie further back than physics.

FCD does not lift a prohibition. It changes the explanandum.

2. The framework in brief

FCD proposes that the laws of nature are not fundamental but are stable patterns arising within a context, and that the context is the vacuum itself. Five axioms:

A1 — Primitive. The only primitive is the local rewrite step $T \rightarrow R(T)$, where T is a dynamic topological complex of knots, braids and loops, and R contains only local topological transformations. At this level neither space nor time exists.

A2 — Criticality. The rewrite rules drive the complex toward critical self-organisation; under coarse-graining R flows to universal fixed points, and those fixed points are the familiar laws.

A3 — Fractality. The fixed-point structure is scale-invariant; every winding is built of windings. Effective dimension is scale-dependent.

A4 — Context principle. The effective laws and "constants" at scale s are state functions of the local vacuum: $L(s) = \Phi(T \mid s)$. Constants are elastic moduli of the vacuum, not universals.

A5 — Invariance. All physical quantities are either topological invariants of stable configurations — charge, spin, particle identity — or statistical quantities of the ensemble — metric, temperature, time.

From these, geometry emerges as the correlation structure of the network ($g = F(T)$); time as an ordering generated by the statistical state rather than a substance; gravity as thermodynamics, with curvature re-readable as a refractive-index profile; and matter as frozen topology, with mass, spin and charge appearing as topological invariants rather than impositions.

A4 is the departure point. Existing emergence programmes — Jacobson's thermodynamic derivation, Causal Dynamical Triangulations, the Wolfram–Gorard rewrite programme, loop quantum gravity — keep the constants universal. FCD does not.

3. The inversion: locality is the thing that needs explaining

The decisive result is not one of FCD's positive claims. It is one of its negative ones.

A computational prototype of the rewrite dynamics was implemented on a 4-regular graph of 3,600 nodes, initialised as a two-dimensional periodic lattice, with a rewrite rule consisting of degree-preserving local double-edge swaps. The probe was deliberately observer-free: the return probability of a random walk, from which a spectral dimension can be extracted as a function of diffusion time. The estimator was validated on the pure lattice, where it correctly returns $D_s \approx 2$.

After thirty thousand unconstrained local rewrite steps the lattice has become an expander graph — a network in which everything lies close to everything — and the measured dimension diverges. Criticality does not come for free from locality. Without a conserving principle, the only fixed point of local rewriting is the free, maximally connected state.

The vocabulary of "disorder" would smuggle in an assumption here: that freedom without structure evaporates into nothing. The opposite reading is the correct one. The expander is the state of maximal connectedness and maximal possibility, in which nothing is fixed. **Geometry is the constraint that creates distance, separation and place.** The less structure, the more freedom. Form is a tensed exception on a free ground state, existing only where conservation holds it.

Read that sentence with the paranormal in mind and the entire explanatory burden inverts.

In the standard framing, separation is free and connection is expensive; you must explain how something crossed the distance. In FCD, connection is free and separation is expensive; you must explain how the distance got there. And the answer is given: by conservation, by tension, by held structure.

It follows immediately that **anomalous correlation at a distance requires no carrier.** It requires only that the constraint producing separation fail to hold completely, locally. Where the conserved structure is weak, or where the network stands nearer its free state, there is simply less distance there.

Nothing has been added to FCD to reach this. It is the direct reading of its own prototype result, which was reported as a failure of the model to produce geometry and is here read as a statement about what geometry costs.

4. Constants as state functions: the anomaly as a context signature

Axiom A4 supplies the second half. If the effective laws at a scale are state functions of the local vacuum, then an anomaly is not a violation. It is a measurement taken at a different value of the context variable.

FCD makes this quantitative in one worked case. Defining local vacuum tension dimensionlessly as $\chi = |\Phi|/c^2$, and adopting the polarisable-vacuum ansatz of Dicke and Puthoff — $\epsilon(\chi) = K \cdot \epsilon_0$, $\mu(\chi) = K \cdot \mu_0$ with $K = e^{\{2\chi\}}$, hence $c_{\text{local}} = c/K$ — the classical tests of general relativity are reproduced to first order without curved spacetime. In Dicke's construction the accompanying variations are tuned so that the fine-structure constant remains exactly invariant. Under A4 that tuning is exact only at the renormalisation fixed point; the fractal structure of the vacuum leaves a residue, $\Delta\alpha/\alpha = \beta \cdot \Delta\chi$, with a benchmark prediction of $\Delta\alpha/\alpha \approx 3.4 \times 10^{-8}$ in the photosphere of the white dwarf G191-B2B.

The methodological point matters more here than the number. FCD has already committed itself to the position that a constant can take a different value in a different context, and has staked a falsifiable prediction on it. Once that is granted, an anomalous observation is no longer a claim that the laws were broken. It is a claim about the state of the local vacuum — and the correct question becomes not *what force did this* but *what was the context, and what changed about it*.

5. The human being as frozen topology

FCD already contains what is needed to place the person, and it was put there for reasons unrelated to this question.

Matter is frozen topology. Elementary particles are stable topological configurations of the network. Strong centres are stable knots — Kauffman's eigenforms, centres reinforcing centres as knots stabilise knots. The Williamson–van der Mark model of the electron as a self-confined photon with toroidal topology is the concrete instance, and van der Mark's later energy-balance argument extends it: the fraction of internal kinetic energy rises from 10^{-14} for the Earth–Sun system through 10^{-8} for hydrogen and 10^{-2} for the deuteron to roughly 0.37 for the proton, so granularity must stop where E_{kin}/E approaches unity. "Stuff" is continuous and topological-electromagnetic.

A living organism is, on this reading, a knot structure of very high order — a great deal of conserved winding, maintained far from equilibrium.

This has one immediate consequence, and it is the one that dissolves the grammar of §1. **The person is not an external agent acting on the network. The person is network structure, with conserved quantities.** There is no gap across which something must be sent, because there are not two separated things between which sending would be required.

Rosen reaches the same destination by an entirely different route. A system closed to efficient causation contains its own agent; the external mover that Aristotle built into every causal chain is not refuted but rendered unnecessary. Rosen's result is systems-theoretic and FCD's is topological, and they converge: an organism does not require something to act through it. That the two arrive independently is the strongest support the position has, because neither was constructed with the other in view.

6. The asymmetry: why breaking and not building

The prototype result of §3 has a second consequence that is straightforwardly testable against the historical record, with no new experiment.

Unconstrained rewriting returns the network to its free state. Release is therefore downhill. Construction is uphill and requires conservation to hold it. A structure exists only where something is conserved; remove or perturb the conserving constraint and the structure does not need to be pushed anywhere — it relaxes.

Prediction: the anomaly record should be overwhelmingly a record of things coming apart, and nearly empty of things being built.

That is what it is. Stopped watches, blown fuses, failed apparatus, cracked glass, spilled liquid, equipment that will not tune, objects that fall. What does not appear, anywhere, is construction: no assembled mechanism, no repaired instrument, no ordered structure produced where none was.

In the standard framing this asymmetry is an embarrassment — it looks like the signature of a phenomenon too feeble to do anything useful, or of misattributed accident. In FCD it is a consequence. Coming apart is what an unconstrained rewrite does. There is no corresponding downhill route to assembly, and so there should be no corresponding phenomenology.

A framework that predicts the shape of a body of anecdote it was not built from has done something, whatever one concludes about the anecdotes.

7. Selection: why *this* object and not another

The remaining difficulty is the one that has always made the subject intractable: the events are not random. They land on something specific, and the specificity looks semantic. A vase of Chinese manufacture floods a room while the person present is entangled in a dispute about Robertus de Fluctibus. Meaning appears to be doing causal work, and meaning is exactly what physics has no way to represent.

The resolution does not require meaning to be causal. It requires a measure of shared ratio structure.

Consider a set of frequencies $F = \{f_1, \dots, f_n\}$ and the coherence coefficient $C(F)$, defined as the fraction of pairs whose ratio, in lowest terms, has both numerator and denominator drawn from the divisor set of a chosen integer N . Two properties matter. First, $0 \leq C \leq 1$, so it is a proper measure. Second, and decisively, **C is invariant under global frequency scaling**. It is dimensionless. It says nothing about how fast anything oscillates and everything about the relations among the rates.

Under weak coupling, finite-variance noise and Kuramoto-type phase dynamics, frequency sets whose ratios are simple maximise synchronisation stability, because Arnold tongue widths scale inversely with the denominator of the ratio in lowest terms. Sets drawn from highly composite numbers do particularly well, and the reason is smoothness rather than cardinality: an HCN is a product of small primes with decreasing exponents, so every ratio of its divisors reduces to small numerator and small denominator.

This gives the selection rule. **Two structures are coupled when they share ratio structure, not when they share a frequency**. Coupling is selective by proportion, and proportion is scale-free, which is why a coupling can hold across systems of wildly different size and rate.

What looks like semantic targeting is then the reading, by an embodied observer, of a shared proportional structure that was already there. The meaning is not the cause. The meaning is what the shared structure looks like from inside a system that reads wholeness — which is precisely the faculty §9 identifies. A metaphor works, on this account, for the same reason: two domains resonate when their structures are proportionally similar, not when their contents match.

This is the point at which the account becomes measurable rather than merely coherent, and it is also the point at which it can most easily fail: C is computable, so the claim that anomalous pairings show elevated C against a null model of random pairings is a real test with a real way of coming out wrong.

8. Time

FCD takes physical time to be an ordering generated by the statistical state itself, following the thermal time hypothesis of Connes and Rovelli. Time is not a substance and not a container; it is what a state does when it becomes statistical.

Anomalous anticipation therefore does not require a signal from the future. Where the statistical state is not fully formed, the ordering it generates is not fully fixed. Nothing travels backwards, because there is no backwards for anything to travel along until the ordering exists.

Rosen arrives at the same place from systems theory: a system containing a model of itself and acting on predicted states is not described by its present state alone, and this dissolves most of what gets classified as anomalous anticipation without any appeal to reversed causation. FCD supplies the physical substrate for what Rosen established formally.

Note what this costs: nothing. Both results were already in the framework, and both were put there for other reasons — Connes and Rovelli to make sense of time in generally covariant quantum theory, Rosen to distinguish organisms from machines.

9. The observer is already inside

The most interesting move is one FCD makes for reasons entirely unrelated to this essay.

The prototype used "spectral dimension approaching 4" as its success criterion, and FCD then rejects that criterion as anthropic. Poincaré argued that the three-dimensionality of space derives from the group of bodily displacements and compensations rather than from the world in itself; Kant placed space among the forms of intuition; Lakoff and Johnson showed that abstract categories, dimension included, are grounded in bodily schemata. The return probability of a random walk is an observer-free statistic, but calling its exponent "dimension" and demanding the value four is a statement about the interface between the vacuum and embodied observers.

FCD's replacement is structural wholeness in Christopher Alexander's sense: levels of scale, strong centres, boundaries, alternating repetition, local symmetries, echoes, not-separateness — several of them mathematised by Salingaros, and grounded empirically in the mirror-of-the-self test, which shows that judgements of harmony are highly consistent across persons. The criterion is observer-anchored but not arbitrary.

The consequence for the present question is large. **FCD has already admitted an embodied observer into the selection of which fixed point counts.** The paranormal is therefore not an intrusion of the subjective into an objective physics; the door was opened for independent reasons, in the technical core, by the framework's own author.

This is also where the body enters as an instrument rather than as a source of error. The Enlightenment settlement classified imagination as delusion and made third-person description more reliable than first-person report by methodological fiat; the assumption outlived the behaviourism that formalised it. Alexander's inter-subjective stability result is the counter-evidence in operational form: a bodily judgement that replicates across people is a measurement, whatever else it is.

10. What the framework forbids

FCD works with forbidden outcomes. A quantised spin-2 graviton falsifies it, since gravity is thermodynamic. A gravitationally explained Webb dipole is excluded, since the reported variation would require a vacuum tension difference far larger than realistic potentials allow.

The corresponding prohibition here is sharp, and it is the essay's main practical result:

FCD can accommodate anomalies that are absences of constraint. It cannot accommodate any anomaly that requires a carrier.

This splits the catalogue.

Admissible. Non-local correlation without transmission. Meaningful coincidence between an inner state and an outer event. Anomalies clustering on critically tuned apparatus. Anomalous anticipation. Effects whose magnitude tracks psychological context, stake and meaning rather than the number of binary events — which is exactly what the mind–matter interaction literature reports when the influence-per-bit assumption is dropped, and which fits A4 directly, since meaning is a statement about context and A4 says context fixes the law.

Inadmissible. Anything requiring transported energy or momentum. A heavy object rising. A directed beam. Information carried by a medium at a propagation speed. Over-unity devices. These are not merely unsupported within FCD; they are excluded by it, because there is nothing in the ontology to do the carrying.

Hence the framework's own empirical prediction about the phenomenology:

Genuine anomalies should be conservation-poor, not energy-rich.

This is checkable against the existing record immediately, and it cuts against most of what is popularly meant by the word "paranormal."

11. The worked case: the Pauli effect

Wolfgang Pauli was accompanied, throughout his working life and by the testimony of colleagues who were not credulous men, by the failure of apparatus in his vicinity. The phenomenon acquired his name as a joke among physicists, which is itself the evidential signature discussed in §12.

The best-documented instance is not a machine but a vessel. At the founding of the C. G. Jung Institute in Zürich on 24 April 1948, a Chinese vase fell without external cause and flooded the floor. Pauli was at that time occupied with the dispute between Kepler and the hermetic physician Robert Fludd — who Latinised his name as Robertus de Fluctibus, Robert of the flowing waters. The reading that connects these was made by Remo Roth, working from Marie-Louise von Franz's material.

Take the case through the account.

No transfer occurred (§5). Pauli is not an external agent; he is a high-order knot structure standing in the same network as the vase. There is no gap and therefore no crossing.

The object was not chosen for its mass but for its tension (§3, §6). A standing, filled, balanced vessel is form held by constraint. So is a cyclotron in tune, a vacuum apparatus, a mounted assembly. These are the configurations nearest their own release, and release is the downhill direction of unconstrained rewriting. The energy was never supplied from outside; it was already stored as constraint.

The specificity is proportional, not semantic (§7). Vessel, water, flood and Fluctibus are not four things joined by meaning. They share ratio structure, and Pauli's unresolved state shared it too.

What an observer reads as meaning is what high C looks like from inside a system built to read wholeness.

The tension was the condition, not the cause (§5, §6). Every account of the phenomenon, including Pauli's own and Roth's reconstruction, places the events at the maximum of an unresolved inner conflict. A structure far from its attractor and oscillating with large amplitude is a structure whose conserved quantities are under load. Nothing needed to be aimed. Pauli did not direct these events; he suffered them, which is what the account predicts, since there is no agent in it to do any directing.

The event is not repeatable, and the framework says why (§3). It required a particular local state of a particular network. Repeatability is a property of contexts that can be reproduced; A4 says the law itself is a state function of the context. A phenomenon whose defining variable is the context is not the sort of thing that repeats to order.

12. On the status of the evidence

The literature here does not prove the case, and an essay claiming otherwise would be refuted by its first serious reader.

What exists is this. The Princeton PEAR programme accumulated very large datasets with very small effect sizes; the multi-laboratory replication attempt led from Freiburg and Giessen did not reproduce the original result. The most thorough meta-analysis of random-number-generator experiments found a small significant effect together with strong evidence of publication bias, and its authors concluded that the bias was the more likely explanation. The reply from Radin, Nelson, Dobyns and Houtkooper does not dispute the funnel-plot asymmetry so much as the model behind it, arguing that the influence-per-bit assumption used to normalise effect sizes is untenable, and that magnitude tracks psychological context, stake and meaning instead — an argument which, whatever its standing in that debate, matches §7 and §10 of this essay closely enough to be worth noting. Bem's precognition experiments failed to replicate in registered attempts. The prospective cardiac-arrest studies report a small number of accounts with apparently veridical content and are limited by the difficulty of the design rather than by any hostility of the investigators. Terminal lucidity is documented in case series and lacks a mechanism.

Two things follow, and they should be kept apart.

First, the record is thin and contested, and nothing in §§3–11 depends on it. The essay derives what the phenomena would have to be. If the phenomena are not there, the derivation stands as an account of why the standard framing could never have found them and why FCD forbids most of what is claimed.

Second, the framework supplies a criterion for reading the record rather than a plea about it. The prediction of §10 — conservation-poor, not energy-rich — sorts the catalogue independently of belief, and it sorts it against the popular meaning of the word. A framework that discards most of the field it purports to explain is not being credulous.

There is one further observation about the record itself, and it belongs to the history of knowledge rather than to physics. Popper wrote that non-reproducible single occurrences are of no significance to science. That sentence excludes most of the history of the universe, all of biography, and every event that happens once to one person. The Pauli effect is not undocumented; it was observed by physicists of the first rank, named, and converted into a joke. In Schank's terms an expectation

broke, the anomaly was registered, and instead of a new index a boundary was produced. That pattern — the blocked re-indexing — is what a field's obituaries record and its textbooks do not, and it is the reason the evidential base is as poor as it is.

13. Open problems

(i) **The mechanism of tension.** FCD's own open list asks what produces and discharges vacuum tension, and whether mass is the source of tension or is itself frozen tension. The present essay adds one step to that question and no more: *is a living knot structure of high order among the things that locally generate and discharge vacuum tension?* This is not a new problem. It is item (iv) of §9 of the FCD paper, read one level further.

(ii) **The recursion between winding levels.** FCD proposes the Bronze Mean recursion, $T(n) = 3T(n-1) + T(n-2)$, giving 1, 1, 4, 13, 43, 142, as the candidate ordering of winding levels. The harmonic-coherence work proposes highly composite numbers, giving 12, 24, 36, 48, 60, 120, 360. These are different families — 13 and 43 are prime; 142 is 2×71 — and they are currently offered as answers to the same question in two documents. A possible resolution is that they are two axes rather than two candidates: the Bronze Mean is a growth recursion, governing the step from one level to the next, while high compositeness is a partition optimum, governing how finely a single level can divide. The number of divisors says nothing about the size of the jump. If that is right it should be written down as two axes, because at present it reads as a contradiction.

(iii) **Operationalising the selection rule.** C is computable. The test is whether reported anomalous pairings show elevated C against a null model of randomly drawn pairings from the same environment. This requires a corpus, a coding procedure, and a pre-registered null — and it is the single piece of work that would move the account from coherent to supported.

(iv) **Upgrading the prototype.** FCD's own next step — replacing the bare graph with an oriented strand diagram carrying conserved winding number and writhe — is prior to all of the above. Until form can be held in the model, nothing about the release of form can be simulated.

(v) **Wholeness as a network measure.** Alexander's properties — levels of scale, strong centres, echoes — need to be operationalised as measures on the network before the observer-anchored criterion of §9 can do formal work rather than interpretive work.

14. Conclusion

The paranormal, on this account, is not an anomaly within physics. It is what physics looks like near the free state.

Every element of the derivation was already present in the framework for other reasons: the free ground state, from a prototype run to test whether geometry emerges; the context principle, from the attempt to make constants derivable; matter as frozen topology, from the strand ontology; thermal time, from general covariance; the embodied observer, from a criterion problem about dimension. None of it was introduced to accommodate the subject, and that is the whole of the claim being made here.

What the account delivers is not a permission. It is a changed explanandum — from *force at a distance* to *the local failure of the constraint that produces distance* — and with it a measure, a

prohibition, and a prediction that can be checked against a record nobody assembled with this framework in mind.

Annotated References

Annotated in the manner of the FCD paper: what each source actually establishes, at what level, and where it is non-mainstream or contested. Nothing below is presented as proving the thesis of this essay; the sources establish the components from which the thesis is assembled, and several of them cut against it.

I. The ontology: distinction, rewriting, and the emergent vacuum

Spencer-Brown, G. (1969). *Laws of Form*. Allen & Unwin. Supplies the primitive of the whole framework: the act of distinction as the origin of form, prior to space, time and matter. A cult classic straddling mathematics and philosophy; short, and more useful read as a calculus than as a philosophy.

Kauffman, L. H. (1987). "Self-reference and recursive forms." *Journal of Social and Biological Structures* 10(1), 53–72. Shows that a distinction applied to itself stabilises into eigenforms, and connects distinction to knot and braid topology. The eigenform is what reappears in §9 as Alexander's strong centre: knots stabilising knots. The bridge between the formal primitive and the topological ontology.

Sakharov, A. D. (1967). "Vacuum quantum fluctuations in curved space and the theory of gravitation." *Doklady Akademii Nauk SSSR* 177, 70–71. Induced gravity: gravitation as an elasticity of the vacuum rather than a fundamental force. Two pages. The organising idea behind vacuum tension χ , and the first respectable statement that a constant might be an output rather than an input.

Volovik, G. E. (2003). *The Universe in a Helium Droplet*. Oxford University Press. Demonstrates in condensed-matter analogues that Lorentz invariance, "particles" and effective metrics all emerge in the low-energy limit of a quantum liquid. The strongest existing precedent for context-dependent laws, and the reason A4 is not eccentric: in Volovik's systems the "constants" of the emergent physics genuinely are state functions of the underlying liquid.

Jacobson, T. (1995). "Thermodynamics of spacetime: the Einstein equation of state." *Physical Review Letters* 75, 1260–1263. Derives the Einstein field equations from $\delta Q = T dS$ on local horizons. Mainstream, much-cited, and the route FCD adopts for gravity — to which FCD adds a forbidden outcome that Jacobson does not commit to: no graviton.

Connes, A., & Rovelli, C. (1994). "Von Neumann algebra automorphisms and time–thermodynamics relation in generally covariant quantum theories." *Classical and Quantum Gravity* 11, 2899–2917. The thermal time hypothesis: physical time is generated by the statistical state itself. Technical, and load-bearing for §8 — without it, anomalous anticipation has to be a signal, and a signal is exactly what the framework cannot supply.

Ambjørn, J., Jurkiewicz, J., & Loll, R. (2005). "Spectral dimension of the universe." *Physical Review Letters* **95**, 171301. Causal Dynamical Triangulations: the spectral dimension runs from ≈ 4 at large scales to ≈ 2 near the Planck scale. Also the model case of an *externally imposed* restoring principle — causal structure — against which FCD's strand-internal alternative is contrasted. The comparison is the point.

Rowlands, P. (2007). *Zero to Infinity: The Foundations of Physics*. World Scientific. The nilpotent Universal Rewrite System, in which the single condition $\Psi^2 = 0$ generates the Dirac equation and the fermion spectrum. Advanced. An independent precedent for rewrite-based physics, and the natural route for deriving quantum amplitudes within FCD's open core.

Dicke, R. H. (1957). "Gravitation without a principle of equivalence." *Reviews of Modern Physics* **29**, 363–376. **Puthoff, H. E. (2002).** "Polarizable-vacuum (PV) approach to general relativity." *Foundations of Physics* **32**, 927–943. The polarisable-vacuum representation: ϵ and μ as functions of gravitational potential, curvature re-read as a refractive-index profile. Dicke is mainstream and Puthoff's development is not widely adopted. This pair is the direct template for §4 — and the tuning Dicke imposes to keep α invariant is precisely what FCD breaks.

Williamson, J. G., & van der Mark, M. B. (1997). "Is the electron a photon with toroidal topology?" *Annales de la Fondation Louis de Broglie* **22(2)**, 133–160. The electron as a self-confined photon with toroidal topology. Non-mainstream but carefully argued. The concrete model behind "matter as frozen topology" and behind the treatment of the organism as a high-order knot structure in §5.

van der Mark, M. B. (2015). "On the nature of 'stuff' and the hierarchy of forces." *Proc. SPIE* **9570**. The energy-balance argument: internal kinetic energy fraction rising from 10^{-14} (Earth–Sun) through 10^{-8} (hydrogen) and 10^{-2} (deuteron) to ≈ 0.37 (proton), so granularity must terminate where $E_{\text{kin}}/E \rightarrow 1$. Concludes that "stuff" is continuous and topological-electromagnetic. Heterodox on quarks; included because the continuity conclusion is what §5 rests on, and the argument for it is quantitative rather than rhetorical.

II. Causation, organisation, and the removal of the external agent

Rosen, R. (1991). *Life Itself*. Columbia University Press. The central non-physics reference for this essay. The Newtonian paradigm is shown to be a special case mistaken for the general one, and closure to efficient causation removes the requirement of an external mover that Aristotle built in. Demanding, and worth the demand. §5 stands on this jointly with the topological argument, and the convergence of two independent routes is the strongest support the position has.

Rosen, R. (1985). *Anticipatory Systems*. Pergamon. A system containing a model of itself and acting on predicted states. This dissolves most of what gets classified as anomalous anticipation without any appeal to reversed causation — the systems-theoretic half of §8.

Whitehead, A. N. (1933). *Adventures of Ideas*. Cambridge University Press. Contains the explicit contrast between law as imposed and law as immanent, and the clearest statement of what goes wrong when an abstraction is taken for a concrete thing. The philosophical precedent for A2 and A4: laws as habits of the substrate rather than legislation over it.

Anderson, P. W. (1972). "More is different." *Science* 177(4047), 393–396. Four pages against the assumption that explanation runs downward, and that each level of complexity requires laws of its own. Universally cited and rarely acted on. Relevant here because §3's inversion is a claim about which level is doing the constraining.

Cartwright, N. (1999). *The Dappled World*. Cambridge University Press. Laws as local and patchy rather than universal, argued from inside the philosophy of physics. The philosophical companion to A4, reached without any of FCD's machinery.

III. Why the standard framing could not have worked

Nietzsche, F. (1887). *Zur Genealogie der Moral*, First Essay §13. The doer is a fiction added to the deed. One page, and the origin of the diagnosis in §1 concerning the grammatical agent.

Korzybski, A. (1933). *Science and Sanity*. Institute of General Semantics. Intended as a training manual and usually read as an epistemology. The non-identity principle and the indexing discipline are the durable part. Worth noting against himself: having rejected Aristotle entirely, Korzybski concludes that mathematics alone has a structure similar to the world's — reinstating the Pythagorean commitment at the moment of discarding the Aristotelian one.

Bakhtin, M. M. (1981). *The Dialogic Imagination*. University of Texas Press. The chronotope essays, including the dating of the detached observer to the adventure novel and of the sealed interior to the biographical novel. The most useful single source for the narrative installation of the neutral observer, and almost never read by philosophers of science. Relevant because the observer that FCD readmits in §9 was a literary device before it was an epistemological principle.

Collingwood, R. G. (1940). *An Essay on Metaphysics*. Clarendon. Metaphysics redefined as the historical study of the absolute presuppositions a period does not question. Short and unfashionable; almost exactly the project of §1 stated in advance.

Bachelard, G. (1938). *La formation de l'esprit scientifique*. Vrin. The epistemological obstacle: what blocks a science is not ignorance but the knowledge it already has. Written thirty years before anyone had the vocabulary of scripts.

Schank, R. C. (1982). *Dynamic Memory*. Cambridge University Press. Expectation failure as the mechanism of learning, and re-indexing as what memory does when a script breaks. The sharpest available statement of why a commitment that works cannot be seen, and — in §12 — of what happened when the Pauli effect was named and then joked about.

Kuhn, T. S. (1962). *The Structure of Scientific Revolutions*. University of Chicago Press. Read here for the claim that representation decides what becomes visible, and for the anomaly that accumulates without being absorbed. Best read alongside Schank rather than against him: a blocked re-indexing at the scale of a discipline.

Popper, K. (1959). *The Logic of Scientific Discovery*. Hutchinson. The source of the exclusion discussed in §12: non-reproducible single occurrences are of no significance to science. Cited here not as an authority but as the mechanism by which the evidential base for a context-dependent phenomenon is guaranteed to remain thin.

Feyerabend, P. (1995). *Killing Time*. University of Chicago Press. The autobiography, and the source of the observation that a small gain in freedom tends to be seized, circumscribed and nailed

down until it becomes a new orthodoxy. The sociology of every closure discussed above, in one paragraph.

Spinoza, B. (1677). *Ethica*, Part III, Prop. 2, Scholium. Nobody has yet determined what a body can do. One sentence, never answered, and the appropriate epigraph for any research programme on human capacity.

Merleau-Ponty, M. (1945). *Phénoménologie de la perception*. Gallimard. Perception as the only access there is rather than a degraded version of a better one, and intercorporeality as the denial that contact between people requires a signal. The philosophical counterpart to §3's inversion.

Bateson, G. (1972). *Steps to an Ecology of Mind*. Chandler. The unit of mind is not bounded by the skin. Essays; the entry point to everything later called extended or enacted cognition, and the plainest refusal of the assumption that the human ends at his surface.

IV. Synchronicity and the Pauli case

Jung, C. G. (1952). "Synchronizität als ein Prinzip akausaler Zusammenhänge." In Jung & Pauli, *Natureerklärung und Psyche*. Rascher. The original formulation: meaningful coincidence of an inner state and an outer event without causal connection. Note the structure of the definition — two of its three terms are a negation and an undefined predicate, which is why the concept has never done formal work. Jung's later extension to *acausal orderedness* is the admission that the original was too narrow.

Pauli, W. (1955). "Der Einfluss archetypischer Vorstellungen auf die Bildung naturwissenschaftlicher Theorien bei Kepler." In the same volume. Pauli's Kepler–Fludd essay: the companion piece to Jung's, and the text he was occupied with at the time of the 1948 incident. Indispensable for the case in §11, since the content of the preoccupation is half the evidence.

Pauli, W. (1994). *Writings on Physics and Philosophy*. Springer. Pauli's later essays on complementarity, the role of the observer, and the relation between physics and psyche. Shows the seriousness and duration of his commitment to the *unus mundus* programme; useful against the assumption that this was a private eccentricity.

Meier, C. A. (ed.) (2001). *Atom and Archetype: The Pauli/Jung Letters 1932–1958*. Princeton University Press. The primary correspondence. The best single source for how the two of them actually reasoned, as opposed to how the collaboration is summarised.

von Franz, M.-L. (1974). *Number and Time*. Northwestern University Press. Jung's assignment to von Franz to develop what he could not follow. Its conclusion — number as the archetype common to psyche and matter — is the Pythagorean move, and it is worth marking as such: the bridge between inner and outer is built out of an external measure. The present essay takes a different route in §7, using ratio structure rather than number as being.

Enz, C. P. (2002). *No Time to be Brief: A Scientific Biography of Wolfgang Pauli*. Oxford University Press. The standard scientific biography, by a former assistant. The soberest available source on the phenomenon that carries his name, and on how his colleagues actually treated it.

Gieser, S. (2005). *The Innermost Kernel: Depth Psychology and Quantum Physics — Wolfgang Pauli's Dialogue with C. G. Jung*. Springer. The most thorough scholarly treatment of the

collaboration. Historically careful and not committed to the metaphysics, which is what makes it usable.

Roth, R. (2011–). *Return of the World Soul: Wolfgang Pauli, C. G. Jung and the Challenge of Psychophysical Reality*. **Pari Publishing**. The source of the reading of the 1948 vase incident used in §11, developed from von Franz's material. Interpretive and committed; cited for the reconstruction of the case, not as independent evidence for it.

V. Coherence, synchronisation, and the selection rule

Kuramoto, Y. (1975). "Self-entrainment of a population of coupled non-linear oscillators." In *Mathematical Problems in Theoretical Physics*. Springer. The canonical model of phase-locking in coupled oscillators and the origin of the critical-coupling threshold. Everything in §7 about synchronisation stability is downstream of this.

Strogatz, S. H. (2000). "From Kuramoto to Crawford." *Physica D* 143, 1–20. The definitive review of what is and is not proven about Kuramoto synchronisation. Useful as a check on how much weight the model will actually carry.

Arnold, V. I. (1983). *Geometrical Methods in the Theory of Ordinary Differential Equations*. Springer. The source for Arnold tongues and the result that locking-region width scales inversely with the denominator of the frequency ratio in lowest terms. This is the mathematical fact on which the whole selection rule of §7 depends, and it is entirely standard.

Ramanujan, S. (1915). "Highly composite numbers." *Proceedings of the London Mathematical Society* 14, 347–409. The classical treatment of integers with a record number of divisors. What matters for §7 is not the record property but the smoothness: an HCN is a product of small primes with decreasing exponents, so ratios of its divisors reduce to small terms.

Winfree, A. T. (1980). *The Geometry of Biological Time*. Springer. Phase resetting, singularities and the response of biological oscillators to perturbation. The standard reference for what happens to a rhythmic system when it is struck at a particular phase — directly relevant to §6's account of release.

Haken, H. (1983). *Synergetics: An Introduction*. Springer. Order parameters and the slaving principle: how macro-level states constrain micro-level processes. The formal companion to Prigogine, and the language in which "constraint density" is usually made precise.

Prigogine, I., & Stengers, I. (1984). *Order Out of Chaos*. Bantam. Dissipative structures and far-from-equilibrium thermodynamics. Explains why a living system must be open and why irreversibility is structural rather than practical — background for treating an organism as a maintained high-tension structure.

Fröhlich, H. (1968). "Long-range coherence and energy storage in biological systems." *International Journal of Quantum Chemistry* 2, 641–649. The original proposal for macroscopic coherence in living matter at physiological temperature. Contested for fifty years and never decisively settled; included because it is the historical origin of the coherence claim, not because it establishes it.

Vitiello, G. (2001). *My Double Unveiled: The Dissipative Quantum Model of Brain*. John Benjamins. Memory as a macroscopic quantum coherence phenomenon in an open system, with

different memories as different vacuum states. Advanced and non-mainstream in neuroscience; relevant here for the vacuum-state formulation rather than the memory claim.

Levin, M. (2021). "Bioelectric signaling: reprogrammable circuits underlying embryogenesis, regeneration and cancer." *Cell* 184(8), 1971–1989. Mainstream and experimentally strong: resting potentials, gap-junction connectivity and global voltage maps are an information-processing medium coordinating form. The best empirical anchor available for treating an organism as an electromagnetically structured object rather than a bag of chemistry.

Friston, K. (2010). "The free-energy principle: a unified brain theory?" *Nature Reviews Neuroscience* 11(2), 127–138. Self-organisation as the minimisation of surprise relative to a generative model. Included for the boundary concept — the Markov blanket — which is the information-theoretic analogue of §3's claim that separation is maintained rather than given.

VI. The observer, embodiment, and the wholeness criterion

Poincaré, H. (1902). *La Science et l'Hypothèse*. Flammarion. Argues that the three-dimensionality of space derives from the group of bodily displacements and compensations. The classical source for the claim that dimension is an embodied category, and the reason §9's criterion problem is not an eccentricity.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the Flesh*. Basic Books. Abstract categories, dimension included, grounded in sensorimotor schemata. Grounds the reinterpretation of "3+1 dimensions" as a statement about the observer–vacuum interface.

Alexander, C. (2002–2005). *The Nature of Order, Books 1–4*. Center for Environmental Structure. The fifteen properties of wholeness, and the mirror-of-the-self test showing that harmony judgements are stable across persons. This inter-subjective stability is what makes the criterion observer-anchored without being arbitrary — the single most important empirical claim in §9, and one that has been replicated informally many times and formally rather few.

Alexander, C. (1977). *A Pattern Language*. Oxford University Press. The earlier, more accessible statement. Alexander's "centres" are the scalar attractors of local fields and his "forces" the vector components — which is why the pattern language translates into the present framework without strain.

Salingaros, N. A. (2005). *Principles of Urban Structure*. Techne Press. Mathematizes several of Alexander's properties via complexity and network theory. The starting point for turning wholeness into a computable measure on the network, which §13(v) identifies as required work.

VII. The empirical record, including the parts that cut against this essay

Jahn, R. G., & Dunne, B. J. (1987). *Margins of Reality*. Harcourt Brace Jovanovich. The PEAR programme's own account. Very large datasets, very small effects. Read together with the next entry.

Jahn, R., Mischo, J., Vaitl, D., et al. (2000). "Mind/machine interaction consortium: PortREG replication experiments." *Journal of Scientific Exploration* 14(4), 499–555. The multi-laboratory

replication attempt involving PEAR, Freiburg and Giessen. It did not reproduce the original effect. Cited because it is the honest result and because PEAR's principals published it themselves.

Bösch, H., Steinkamp, F., & Boller, E. (2006). "Examining psychokinesis: the interaction of human intention with random number generators — a meta-analysis." *Psychological Bulletin* 132(4), 497–523. The most thorough meta-analysis in the field: a small significant overall effect together with strong evidence of publication bias, which the authors conclude is the more likely explanation. This is the principal evidence *against* the phenomenon and belongs in any honest list.

Radin, D., Nelson, R., Dobyns, Y., & Houtkooper, J. (2006). "Assessing the evidence for mind–matter interaction effects." *Journal of Scientific Exploration* 20(3), 361–374. The reply. Its core argument is not about funnel plots but about the model behind them: the influence-per-bit assumption used to normalise effect sizes is untenable, and effect magnitude tracks psychological context, stake and meaning rather than the number of binary events. Whatever its standing in that dispute, the claim matches §7 and §10 closely, and constitutes the one place where the present account makes contact with a quantitative empirical argument.

Bem, D. J. (2011). "Feeling the future." *Journal of Personality and Social Psychology* 100(3), 407–425. Ritchie, S. J., Wiseman, R., & French, C. C. (2012). "Failing the future." *PLoS ONE* 7(3), e33423. Cited as a pair. Bem's result and its failure to replicate in registered attempts; the episode did more to advance the replication crisis in psychology than to establish precognition, which is itself worth noting.

Nelson, R. D., et al. (2002). "Correlations of continuous random data with major world events." *Foundations of Physics Letters* 15, 537–550. The Global Consciousness Project. Methodologically contested, particularly regarding event selection and post-hoc specification. Included because it is the only large-scale attempt at the collective-scale prediction that a coherence framework naturally makes, not because its analysis is settled.

Parnia, S., et al. (2014). "AWARE — AWAREness during REsuscitation: a prospective study." *Resuscitation* 85(12), 1799–1805. The prospective cardiac-arrest study. A small number of accounts with apparently veridical content; the design is extraordinarily difficult and the yield correspondingly thin. Honest about its own limits, which is why it is usable.

van Lommel, P., et al. (2001). "Near-death experience in survivors of cardiac arrest: a prospective study in the Netherlands." *The Lancet* 358, 2039–2045. The earlier prospective study. Establishes incidence and the absence of correlation with medication or duration; does not establish veridicality.

Nahm, M., Greyson, B., Kelly, E. W., & Haraldsson, E. (2012). "Terminal lucidity: a review and a case collection." *Archives of Gerontology and Geriatrics* 55(1), 138–142. Documented case series without a mechanism. Included as an instance of the §12 pattern: registered, named, and not re-indexed.

VIII. The variation of constants: where the framework is actually testable

Webb, J. K., et al. (2011). "Indications of a spatial variation of the fine structure constant." *Physical Review Letters* 107, 191101. The reported $\Delta\alpha/\alpha$ dipole at the 10^{-5} – 10^{-6} level from quasar absorption spectra. FCD predicts this dipole cannot be gravitational in origin, since the required

vacuum tension difference is far larger than realistic potentials allow — one of the framework's forbidden outcomes, and a place where it can be shown wrong by someone else's data.

Berengut, J. C., et al. (2013). "Limits on the dependence of the fine-structure constant on gravitational potential from white-dwarf spectra." *Physical Review Letters* 111, 010801.

Establishes hot white dwarfs as probes of α in strong gravitational potentials. The experimental arena for the central quantitative prediction of §4.

Hu, J., et al. (2019–2021). White-dwarf α -variation analyses (MNRAS), including $\Delta\alpha/\alpha = (0.007 \pm 0.087) \times 10^{-6}$ for G191-B2B. The sharpest current spectroscopic bound, giving $\beta \leq \sim 1.5 \times 10^{-3}$. Bibliographic details should be verified against the primary publications.

Uniyal, A., Kalita, S., Mizuno, Y., Chakrabarti, S., & Lu, Y. (2025). "Refining fundamental constants with white dwarfs." *MNRAS* 542, 3395–3401. Gaia-DR3 mass–radius constraints reaching $|\Delta\alpha/\alpha| \sim 10^{-7}$ — the level at which the benchmark prediction of 3.4×10^{-8} becomes decidable. This is the reference that makes the framework a live empirical proposition rather than an interpretation.

IX. The author's own prior work referenced above

Konstapel, J. (2026). "Fractal Context Dynamics: A Context-Dependent Framework for the Emergence of Physical Law." *Leiden*, 26 July. The framework this essay applies. Sections 1–4 reinterpret existing results within a single ontology; §5 supplies the quantitative benchmark; §6 reports the two negative results on which §3 and §6 of the present essay depend; §7 states the criterion problem; §9 lists the open problems extended in §13 here.

Konstapel, J. (2026). "Nilpotent Field Dynamics and Harmonic Coherence: A Formal Theory of Substrate-Independent Integrated Systems." The source of the coherence coefficient used in §7. Two definitions require tightening before the results carry: the divisor-ratio graph must weight edges by the denominator of the reduced ratio, since ratios of integers are rational unconditionally; and the coherence coefficient must be defined over numerator and denominator of the reduced ratio rather than over the ratio itself.

Konstapel, J. (2026). "The Assumptions Nobody Declares." *Leiden*, 27 July. The inventory of fifty-eight undeclared commitments, of which §1 above uses five, and the source of the argument that correcting the physics yields a permission rather than a capacity.

Konstapel, J. (2025). "Searching for the Roots of Synchronicity." *constable.blog*, 5 November. The four-root account — *unus mundus*, Logos and Eros, oscillation, magma — of which the third is given a formal selection rule in §7 above and the second a structural place in §9.

Konstapel, J. (2007). "Jane Roberts and Wolfgang Pauli Explain the Bridge between Psychology and Quantum Mechanics." *constable.blog*, 26 October. The source of the Pauli case as used here, including Roth's reconstruction of the 1948 incident.

Leiden, July 2026.