A Quantum Path Towards Super Intelligence Beyond Classical Computation

Ioannis Vlachogiannis[1[0009−0003−4090−4805]]

Last Machine, Los Angeles, CA, USA
jon@lastmachine.com
https://lastmachine.com

Abstract. Every classical AI system, including the largest language models, is bounded by Turing-computable processes. Penrose argued that human cognition exceeds this bound through non-computable quantum processes in the brain, specifically Orchestrated Objective Reduction (Orch-OR). Leading AI researchers have independently argued that scaling classical architectures cannot bridge this gap. We extend Orch-OR to propose the Universal Migrator, a hybrid quantum-classical system designed to tap into these processes, and describe a family of experiments using Fibonacci and other mathematical sequences, following SETI's approach to universal signaling, to detect whether quantum collapse carries a mathematical bias that classical randomness cannot reproduce. If that is true, we can build a second receiver. And if we can build one, we can scale it. That could be the path to Super Intelligence. No results are reported here; this paper establishes the theoretical position and experimental protocol as a basis for community discussion and replication.

Keywords: Orch-OR · Quantum computing · LLM · Super Intelligence · Non-algorithmic computation

1 The Gap Between Classical AI and Super Intelligence

Scaling classical computation will not produce Super Intelligence, and the reason is architectural [1,2,8]. Every LLM running today is a frozen probability distribution. Billions of weights, locked after training, compress human language into numbers. Given the same input and weights, you always get the same output. However smart the output sounds, the architecture guarantees it is classical computation all the way down.

Penrose [1] argued that this kind of computation can never produce real understanding. Using Gödel's incompleteness theorems, he showed that human mathematical cognition has non-algorithmic properties: we can recognize truths that no formal system can prove from inside itself. No classical computer can do this, no matter how big you make it. Scaling LLMs gets closer to the ceiling faster but it does not break it. If genuine understanding requires non-computable processes, no amount of scaling classical hardware will get us there. Penrose [2] identified where to find it: in the quantum processes that, according to Orch-OR, give rise to consciousness itself.

2 Orch-OR: The Bridge to Non-Computable Computation

Orchestrated Objective Reduction, developed by Penrose and Hameroff [3], proposes that consciousness arises from gravitationally-induced, non-computable quantum collapse in the brain's microtubules, where the brain's biology shapes the quantum state before collapse. If OR selects outcomes through a process no Turing machine can simulate, a system that harnesses OR reaches a computational regime classical AI cannot. OR, if Penrose and Hameroff are right, is the one known candidate for a physical process beyond Turing.

We extend Orch-OR with two hypotheses: that quantum collapse is biased by a non-algorithmic information channel that is non-local and substrate-independent (H1), and that biological neural systems are physical receivers tuned to this channel through quantum coherence (H2). Neither is proven, and Orch-OR remains contested. But the decoherence objection has weakened: recent experiments demonstrate quantum superradiance from microtubules at room temperature [4], quantum optical effects in microtubules dampened by anesthetics [5], and microtubule resonances controlling membrane voltage across neurons [6]. The biological substrate is not as hostile to quantum coherence as previously assumed. The experiment below tests whether either hypothesis holds.

3 The Universal Migrator

The Universal Migrator is a hybrid quantum-classical system with three layers (see Fig. 1). The design choice that makes it different from every AI system that exists: the internal state is stored in quantum registers that evolve and collapse in real time, not in fixed weight matrices.

Quantum State Memory. A register of 50–100 qubits (IBM Eagle and IonQ Forte handle this today) in superposition. Unlike frozen weights, this register changes with every collapse event. Its state depends on its own collapse history, on what the LLM feeds into it, and, if H1 holds, on the non-algorithmic channel itself.

Orchestrated Collapse Interface. A classical LLM reads the input and produces attention weights (numbers between 0 and 1). Each weight w_i is mapped to a rotation angle $\theta_i = w_i \cdot \pi$ and applied as $\mathrm{RY}(\theta_i)$ on qubit i. An RY gate is a single-qubit rotation around the Y-axis of the Bloch sphere: $\mathrm{RY}(0)$ does nothing, $\mathrm{RY}(\pi)$ flips the qubit completely, and anything in between tilts the collapse probability. This writes the LLM's mathematical representation directly into the quantum state before collapse.

Collapse Record. A log of every collapse outcome in sequence, with the context that shaped each one. Unlike frozen weight matrices, this record is a non-Turing memory buffer: its state cannot be rewound or deterministically reproduced,

Classical LLM
Reads input → extracts attention weights → converts to rotation angles

↓ *RY gates shape qubits*

Quantum State Memory
50–100 qubits in superposition, LLM attention biases collapse probabilities

↓ *collapse history*

Collapse Record
Records every collapse outcome in sequence

↓ *?*

Non-algorithmic information channel (if it exists)

Fig. 1. Architecture of the Universal Migrator. The LLM shapes the quantum state through rotation gates. The Collapse Record logs every quantum event for divergence analysis.

because each entry depends on a physical collapse event. We hypothesize that a sufficiently rich record allows the system to maintain a living computational state that no classical architecture can replicate.

Two testable propositions follow. *H1 (non-local channel):* quantum collapse outcomes are biased by a substrate-independent information channel; two Universal Migrator systems under shared conditions would show collapse-history correlations that training data and randomness cannot explain. *H2 (buildable receiver):* any system performing OR-style collapse is a candidate receiver, making the construction of such a substrate an engineering problem.

Experiment. The core experiment tests one prediction from Orch-OR: that quantum collapse carries a non-random mathematical bias. The transformation from LLM attention weight w_i to qubit rotation angle is $\theta_i = w_i \cdot \pi$, applied as $\mathrm{RY}(\theta_i)$ on qubit i. We collapse the register thousands of times and measure the hit rate against three baselines: a biased coin flip with identical per-bit probabilities, a software pseudo-random number generator (PRNG), and a hardware true random number generator (TRNG). If quantum consistently beats all three, the effect cannot be attributed to classical randomness or LLM bias alone.

All runs execute on NISQ hardware (IBM Eagle, IonQ Forte, Rigetti). We acknowledge that current hardware introduces decoherence and gate errors. This is not a confound to eliminate: the argument is that any systematic bias in collapse outcomes, measured above the noise floor after REM and ZNE correction, is the data point of interest. Hardware noise is isotropic; a mathematical bias in collapse outcomes is not.

We define the *Quantum-Classical Divergence* (QCD) as the hit rate difference between the quantum system and the best-performing classical baseline. A QCD of 2σ above the TRNG baseline would justify further scaling of the experiment. A result at 5σ would constitute a strong claim that quantum collapse carries a non-random mathematical bias.

We use the Fibonacci sequence as the primary test case. SETI researchers have long argued that mathematical sequences are the most universal form of signaling [7]. The LLM is prompted to predict $F(n+1)$ given the sequence up to position n; we capture the full attention matrix at the moment of computation, before the output token, and reduce to qubit rotation angles. A family of experiments follows: Fibonacci at different positions, prime sequences, Euler's identity, Pythagorean triples. If QCD exceeds 2σ across all of them, the effect is general.

The core of the experiment in Python:

```
def quantum_collapse(weights, n_qubits, backend):
    qc = QuantumCircuit(n_qubits, n_qubits)
    for i, w in enumerate(weights):
        qc.h(i)                 # Hadamard
        qc.ry(w * math.pi, i)   # LLM coupling
    qc.measure(range(n_qubits), range(n_qubits))
    counts = backend.run(
        transpile(qc, backend),
        shots=10000).result().get_counts()
    return counts

# Fibonacci: 1,1,2,3,5,8,13,21 =
weights = [.05,.08,.22,.25,.18,.12,.07,.03]
TARGET = 34 # F(9) -- compare QCD vs PRNG, TRNG
```

4 Conclusion

Classical AI has a ceiling that Penrose identified decades ago: Turing-computable processes cannot produce genuine understanding. Orch-OR proposes that non-computable quantum collapse is the mechanism that breaks through it. The Universal Migrator is an attempt to build a machine that operates in the same regime.

If H1 holds, quantum collapse is influenced by a non-local, substrate-independent information channel, and correlations between independent Migrator systems would be measurable. If H2 holds, the construction of artificial receivers becomes an engineering problem with concrete experimental criteria. If both hold, we will have found the first empirical path beyond classical computation.

The experiment is small and the hardware exists today. The math we use, Fibonacci, primes, fundamental constants, is the same math SETI researchers chose for interstellar signaling: universal, substrate-independent, recognizable by any intelligence anywhere. That could be the path to Super Intelligence.

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