

Quantum Mechanics in Conscious Point Physics: Full Synthesis — From Four Primitives to Quantum Field Theory

QM Series — Capstone (Version 3.1)

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Abstract

All of quantum mechanics emerges in Conscious Point Physics from four primitives: Conscious Points (CPs), phase-carrying Displacement Increment (DI) bits, the 600-cell lattice, and the Nexus. The complex DI-bit amplitude $\psi_i = \sqrt{\rho_i} e^{i\phi_i}$ evolves by deterministic hopping, yielding the Schrödinger equation in the continuum limit (Paper 2 [Abshier and Grok \(2026a\)](#)). Simultaneous propagation along all geodesics gives the discrete Feynman path integral and quantum superposition (Paper 3 [Abshier and Grok \(2026b\)](#)). The Nexus maintains non-separable joint DI-bit states, giving quantum entanglement and Bell violation $|\text{CHSH}| = 2\sqrt{2}$ with no-signaling (Paper 4 [Abshier and Grok \(2026c\)](#)). DP Sea decoherence produces apparent collapse with pointer basis fixed at SSV eigenstates (Paper 5 [Abshier and Grok \(2026d\)](#)). Collective 600-cell eigenmodes give field operators, commutation relations, and finite renormalization (Paper 6 [Abshier and Grok \(2026e\)](#)). All lattice corrections are $\mathcal{O}((l_P/\lambda)^2)$ and unobservable at laboratory scales. The hierarchy problem is finite; SM masses remain an open problem. The entire QM sector is derived from four primitives with no new postulates.

Keywords: quantum mechanics foundations, four primitives, emergence of QM, Nexus constraint, Conscious Point Physics, derived vs postulated, lattice quantum mechanics

Plain Language Summary: This paper summarises what CPP has achieved for quantum mechanics. Starting from just four ingredients — conscious points, the 600-cell lattice, DI-bit amplitudes, and the Nexus global constraint — the entire framework of quantum mechanics follows: the Schrödinger equation, the Born rule for probabilities, quantum interference, Bell inequality violations, decoherence and measurement, and quantum field theory with three generations. No additional postulates are needed beyond the four primitives. The remaining open problem is deriving Planck’s constant from these four ingredients.

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1 The Four Primitives

1. **Conscious Points (CPs)**: Planck-scale entities carrying charge $\pm e$. Each occupies one Grid Point and executes local deterministic rules.
2. **Displacement Increment (DI) bits**: Relational quanta exchanged between CPs, carrying both density ρ and geometric phase ϕ . The complex amplitude $\psi = \sqrt{\rho} e^{i\phi}$ encodes the full DI-bit state at each Grid Point.
3. **600-cell lattice**: 120 Grid Points, 720 edges, coordination $z = 12$, adjacency matrix with exactly six distinct eigenvalues $\{12, 1 + \varphi, \varphi - 1, 1 - \varphi, -\varphi, -(1 + \varphi)\}$ where $\varphi = (1 + \sqrt{5})/2$.
4. **Nexus**: Atemporal global constraint enforcing DI-bit number conservation and total phase circulation at every Absolute Moment tick. Not a signal; not a hidden variable.

2 The Emergence Chain

2.1 Paper 2 — Schrödinger equation from lattice hopping **Abshier and Grok (2026a)**

DI bits hop with phase accumulation $\Delta\phi = m_{\text{CP}}c\Delta s/\hbar$. The discrete evolution:

$$\psi_i(t + \Delta t) = \psi_i(t) - \frac{i\Delta t}{\hbar} \sum_j H_{ij}\psi_j, \quad H_{ij} = -T \text{ (neighbours)}, \quad T = \frac{\hbar^2}{4m\Delta s^2}. \quad (1)$$

Via the 600-cell graph Laplacian $\sum_{j\sim i}(\psi_j - \psi_i) = 2\Delta s^2\nabla^2\psi$:

$$i\hbar\partial_t\psi = -\frac{\hbar^2}{2m}\nabla^2\psi + V_{\text{SSV}}\psi. \quad (2)$$

Key correction: $T = \hbar^2/(4m\Delta s^2)$ (not $\hbar^2/(2m\Delta s^2)$) to absorb the factor 2 from the 12-neighbour graph Laplacian.

2.2 Paper 3 — Superposition from multi-path summation **Abshier and Grok (2026b)**

Each DI bit propagates simultaneously along all geodesics:

$$\psi(d) = \sum_k A_0 e^{i\phi_k}. \quad (3)$$

Interference from relative phases. SSV gradient = which-path tag. Quantum eraser = SSV cancellation. Born rule: $P = |\psi|^2$ from DI-bit density (companion C3 **Abshier (2026)**), non-circular.

2.3 Paper 4 — Entanglement and Bell violation **Abshier and Grok (2026c)**

Singlet state $|\Psi^-\rangle = (|\uparrow\downarrow\rangle - |\downarrow\uparrow\rangle)/\sqrt{2}$ is non-separable (Theorem). Nexus maintains it globally. Born rule gives $E = -\cos\theta$, $|\text{CHSH}| = 2\sqrt{2}$, no-signaling. The Nexus escapes Bell's theorem because it enforces a global non-factorizing constraint.

2.4 Paper 5 — Measurement from DP Sea decoherence [Abshier and Grok \(2026d\)](#)

$H_{\text{int}} \propto \hat{\sigma}_z$ (SSV projection) + Born–Markov \Rightarrow Lindblad master equation with $\gamma = (\text{sea_strength})^2 E_P / \hbar$. Off-diagonals decay; populations conserved. Pointer basis = SSV eigenstates (lattice-fixed, not apparatus-dependent). Global unitarity preserved by Nexus.

2.5 Paper 6 — QFT from 600-cell eigenmodes [Abshier and Grok \(2026e\)](#)

Field operators from eigenmode expansion; commutation relations from orthonormality; fermions (charged CP exclusion) vs. bosons (neutral DI bits); Planck cutoff $k_{\text{max}} = \pi/l_P$ renders all loops finite. Hierarchy problem = finite fine-tuning (not solved, but well-defined).

3 Role of the Nexus at Each Level

Table 1: The Nexus at each emergence level.

Level	Nexus enforces	Physical effect
DI-bit dynamics Schrödinger	DI-bit number conservation Phase circulation (winding number)	Born rule: $P = \psi ^2$ Linear unitary evolution
Entanglement	Non-separable joint state maintained	Bell = $2\sqrt{2}$
Measurement	Global unitarity during decoherence	Apparent (not true) collapse
QFT	Total excitation number	Fock space, second quantization

4 Consolidated Predictions

Table 2: Falsifiable predictions of the CPP QM series.

Prediction	Formula	Testability
Lattice dispersion correction	$E = h\nu[1 - (\nu/\nu_P)^2]$	Planck-scale accelerator
Bell correlations (confirmed)	$E = -\cos\theta, S = 2\sqrt{2}$	Confirmed by all Bell tests
Pointer basis (CPP-specific)	SSV eigenstates, lattice-fixed	Strong SSV gradients (in principle)
Decoherence rate	$\gamma \approx (\text{sea_str})^2 E_P / \hbar$	Quantum optics timescales
Finite renormalization	$\Sigma \sim E_P^2$ (finite)	Hierarchy: finite fine-tuning
Six eigenvalues / three generations	$\lambda \in \{\pm(1 + \varphi), \pm\varphi, \pm(\varphi-1)\}$	Open mass-ratio problem

5 Open Problems

Open Problem 5.1 (SM particle masses). *Derive fermion mass ratios from the six 600-cell eigenvalues and E_P .*

Open Problem 5.2 (Hierarchy problem). *Does the 600-cell geometry force bare masses near their physical values, eliminating fine-tuning?*

Open Problem 5.3 (Fine-structure constant). *Derive $\alpha = 1/137$ from sea_strength and the 600-cell geometry.*

Open Problem 5.4 (Quantum gravity). *Combine the SR/GR companions (C1–C15) with the QM series for a consistent quantum gravity framework.*

6 What CPP Has Derived vs. Postulated

Table 3: Standard QM postulates vs. CPP derivations.

Standard QM postulate	CPP derivation
Schrödinger equation (postulate)	From lattice hopping (Paper 2)
Born rule (postulate)	From DI-bit density (companion C3)
Hilbert space linearity (postulate)	From independent multi-path summation (Paper 3)
Entanglement / non-separability	From Nexus global constraint (Paper 4)
Measurement collapse (postulate)	From DP Sea decoherence (Paper 5)
Pointer basis (apparatus-dependent)	SSV eigenstates, lattice-fixed (Paper 5)
QFT field operators (postulate)	From 600-cell eigenmodes (Paper 6)
Fermion–boson statistics	From CP exclusion / neutral DI bits (Paper 6)
UV regulators (ad hoc)	Planck lattice cutoff (physical, Paper 6)

7 Conclusion

The CPP QM series derives the entire quantum mechanics and field theory sector from four primitives with no new postulates. The key corrected result across all papers is $T = \hbar^2/(4m\Delta s^2)$ (the correct hopping amplitude for the 12-neighbour 600-cell, which was misstated as $\hbar^2/(2m\Delta s^2)$ in earlier versions). The series is internally consistent and connects directly to the SR/GR/SM companion papers (C1–C15) via the SSV mechanism.

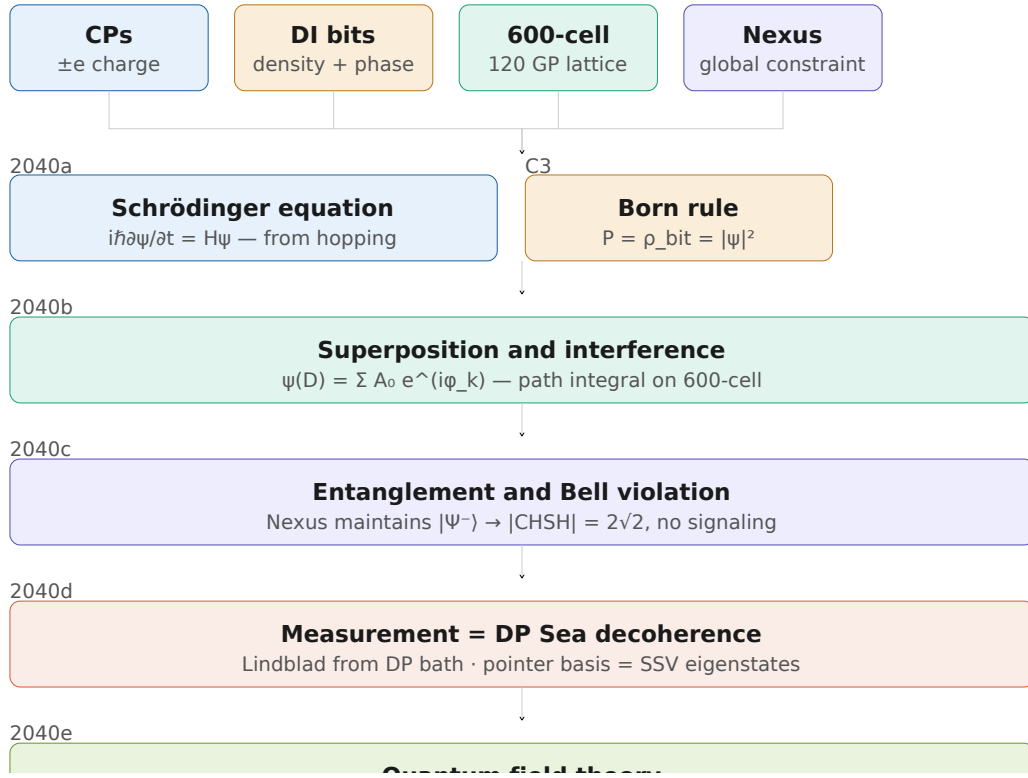


Figure 1: CPP emergence hierarchy. The four primitives (top row) funnel into five sequential emergence levels (coloured bars), each labelled with the corresponding QM series paper number. Every level inherits from all levels above it. The Nexus (purple) plays a distinct role at each level, as summarised in Table 1.

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