1 Spinor–Clock Thought Experiment and Field-Coherence Logic

1.1 Conceptual Setup

Consider two identical *spinor clocks*: local oscillators whose tick is the π–parity flip of a reference spinor ψ_0. The clocks

[label=0.]

1. start co–located and phase–locked, $\Phi_1 = \Phi_2$;
2. follow distinct world-lines γ_1, γ_2;
3. reunite and compare accumulated tick counts.

In our framework each world-line segment carries two logically separate data streams:

quantity	**carrier**	**role**
global phase gradient $\nabla\alpha$	$\Phi = e^{i\alpha}$	Weyl-scale $\rho(x) = \|\nabla\alpha\|$ (sets tick *rate*)
[4pt] spinor direction ψ_0	local $\mathrm{SU}(2) \subset \mathrm{Spin}(3,1)$ frame	chooses *which* parity branch ($\pm$)

1.2 Case A: Clocks Remain Causally Linked

As long as each clock stays inside the others future light-cone within a time $\ll \rho^{-1}$, a web of neutral 0-fibres continuously shuttles phase information between the two Klein-bottle sheets. The intersection condition enforces an *antipodal lock*

$$\left[\psi_0^{(1)}(\tau),\, \psi_0^{(2)}(\tau)\right] \;=\; \text{antipodal} \qquad \forall\, \tau.$$

Operationally:

- A single flip registered by clock 1 shows up to clock 2 as a forbidden null-sector flip unless clock 2 performs the conjugate flip itself.
- The joint state is limited to the two-sheet geometry; the number of independent observables is reduced by one conjugate pair, reproducing the Heisenberg bound $\Delta q\, \Delta p \geq \hbar/2$ as a *history-counting* effect.

1.3 Case B: Non-causal Separation

If γ_1 and γ_2 become space-like separated for a macroscopic proper time ΔT, neutral fibres cannot enforce the lock. Each spinor direction ψ_0 may rotate freely in SU(2) without energetic cost while the individual tick rate is still set by the scalar $\rho(x)$.

Upon reunion the clocks may differ by an additional half-parity. Summary comparison:

	Causal link	**No causal link**
tick correlation	parity preserved	parity free to drift
superposition stability	inhibited	allowed
measurement spread	$\Delta q\,\Delta p \geq \hbar/2$	classical mix until sync

1.4 Implications for Macroscopic Decoherence

A composite object with $N \gg 1$ internal null-fibres has a neutral link mesh scaling as N^2; the probability of *all* links escaping causal reconnection behaves as $\sim e^{-N}$. Hence macroscopic bodies all but never form stable superpositions, whereas a single spin-$\frac{1}{2}$ or photon path can.

1.5 Relation to Other Language

- **Twin paradox** is recovered: clocks differ by the ρ-weighted proper time plus a possible half-parity slip for space-like detours.
- **Bohmian preferred foliation** is replaced by the global pinor sheet: causal contact chooses the allowed sheet.
- **Lorentz covariance** remains intact—$\nabla\alpha$ is a scalar, ψ_0 transforms in the usual spin representation; constraints activate only when null-fibres reconnect events.

1.6 Minimal Take-away

Local *tilt* (spinor direction) is free to rotate, but the *global* gradient $\nabla\alpha$ fixes the clock-rate scalar ρ. When null-fibres knit two regions together, parity branches are locked antipodally, yielding the uncertainty principle. Outside causal contact the lock opens and distinct tick counts merely record independent world-tube historieswithout violating Lorentz symmetry.