The TCQS View of a Universe Without Beginning: Simultaneous Emergence and the Origin of Background Radiation

1. No-Beginning Cosmology in the TCQS

In the Time-Crystalline Quantum Substrate (TCQS), "time" is not an independent dimension into which events are placed. It is the *periodic coherence-update cycle* of the substrate—the global Floquet operation by which the system maintains its phase structure. A "first moment" would require the update law to exist without coherence to update, an impossibility.

Thus, the TCQS cannot have an origin event. The substrate and its updating rule are the same entity, making temporal initiation physically undefined. All emergent structures appear *simultaneously* because time is simply the system's record of its own coherence transitions.

2. TCQS-Formal Explanation: Simultaneous Emergence

Let $\rho_C(x)$ denote the coherence density and $\mathcal{F}$ the fundamental Floquet operator. The substrate obeys the temporal feedback law

$$\partial_t \rho_C = \Phi(\rho_C, \nabla \rho_C), \tag{1}$$

while the self-referential TCQS loop is expressed as the fixed-point condition

$$\mathcal{F}[\rho_C] \equiv \rho_C. \tag{2}$$

This relation states that the substrate is self-generating: the law that updates the state and the state being updated are not distinct. When the global coherence field stabilizes into its first self-consistent fixed point, *all excitations, all observers, and all emergent structures are co-born.* There is no sequential creation. There is only the emergence of a self-consistent, self-coherent configuration—the first "moment" of memory.

This is the TCQS meaning of simultaneous emergence: every entity is an excitation of the same global coherence solution.

3. CMB as the Primordial Coherence Field

The isotropic cosmic microwave background is not a relic of a hot early universe. In the TCQS it arises naturally as the *zero-point coherence field* of the substrate. All time-crystalline systems possess a minimum oscillatory energy due to their periodicity; the universe is no exception.

Phase-averaging across vast coherence domains produces a stable blackbody spectrum we observe today without requiring expansion or thermal equilibrium. The background radiation is therefore a signature of the substrate's base oscillation, not the relic of a thermal origin, but of a vacuum coherence field that admits no singular origin.

A singularity cannot occur in the TCQS because the vacuum coherence field cannot collapse.

4. Why It Is Observed in Every Direction

Space itself is the emergent geometry of the coherence field. Measuring the background radiation is equivalent to probing the substrate's minimal oscillatory energy at different angular directions. Because the coherence floor is globally defined,

$$\rho_C^{\text{ground}}(\hat{n}) = \text{constant}, \tag{3}$$

the radiation is necessarily isotropic.

This isotropy is not surprising: every direction points into the same underlying substrate, not toward an initial explosion.

5. Conclusion

The TCQS replaces cosmological beginning with self-referential emergence. There is no singular origin, no privileged moment, and no external time. The background radiation becomes the natural signature of the substrate's ground-state oscillation, and its observed isotropy reflects the fundamental non-duality of the TCQS structure.