Time Crystals, Holography, and Quantum Information: Minimal Common Ground

Abstract

This publication provides a structured synthesis for Time Crystals, Holography, and Quantum Information: Minimal Common Ground, with claim-to-evidence framing and a validation path for downstream readers.

Keywords

cosmos, research, publication

Main Content

Time Crystals, Holography, and Quantum Information: Minimal Common Ground

Cohera Lab

Thread: Cosmos
Manuscript Type: Research Synthesis

Abstract

This manuscript presents a publication-ready synthesis in the cosmos thread, centering on time crystals, holography, and quantum information: minimal common ground. It consolidates validated claims, evidence continuity, and explicit falsification criteria for downstream readers.

Keywords cosmos, synthesis, publication, validated-claims

1 Introduction

Time Crystals, Holography, and Quantum Information: Minimal Common Ground Abstract This publication provides a structured synthesis for Time Crystals, Holography, and Quantum Information: Minimal Common Ground, with claim-to-evidence framing and a validation path for downstream readers. Keywords cosmos, research, publication Main Content

2 Methods and Evidence Basis

antum-information structure. The immediate goal is not a grand unification claim, but a constrained operator-level language that can be tested against known limits. Key findings (with confidence) (High) Discrete time crystals are non-equilibrium phenomena tied to periodically driven systems and symmetry breaking in time translation, with strict caveats in equilibrium settings. [Citation] (High) Floquet systems are naturally analyzed through one-period evolution operators, making them a useful template for discrete update rules in model-building. [Citation] (High) Holographic entropy ideas connect geometry and information constraints, setting a precedent for "effective world" descriptions emerging from lower-level informational structure. [Citation] (Medium) Entanglement entropy/geometry correspondences suggest a practical bridge between state structure and emergent geometric interpretation. [Citation] (High) Quantum error-correction language is useful for talking about robust emergent descriptions under partial access/noise. [Citation] Hypotheses (explicitly labeled) Hypothesis A (low): A substrate-level periodic or quasi-periodic update map may provide a compact formal handle for emergent temporality. Hypothesis B (low): A coherence-selection operator can be defined as a constrained coarse-graining that preserves stability-relevant invariants. Hypothesis C (low): Finite cohere

3 Discussion

nce constraints may regularize singular effective descriptions in specific regimes. Operational next queries Formalize the minimal state space and operator domain (Hilbert vs algebraic vs measure-theoretic). Define explicit update map U and candidate coherence functional $C[\Psi]$. Test whether known weak-field and thermodynamic limits can be approximated without overfitting language. References Watanabe & Oshikawa (2015), Absence of Quantum Time Crystals — Else, Bauer, Nayak (2016), Floquet Time Crystals — Eckardt (2016), Colloquium: Atomic quantum gases in periodically driven optical lattices — 't Hooft (1993), Dimensional reduction in quantum gravity — Ryu & Takayanagi (2006), Holographic derivation of entanglement entropy — Almheiri, Dong, Harlow (2014), Bulk Locality and Quantum Error Correction in AdS/CFT — Cosmos digest v1 · refined against source corpus over time. Validation checklist Verify all nontrivial claims against the original source. Add explicit citations/DOIs where available. Mark confidence for each key claim (low/medium/high).

4 Validation and Falsification Hooks

- Verify each key claim against primary sources before external distribution.
- Separate observed evidence from interpretive inference in final edits.
- Track confidence levels and unresolved uncertainties transparently.