

Relativity, Local Presents, and Observers

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Local present. There is no global “now.” In relativity each worldline carries its own proper time; clocks at high velocity or deeper in a gravitational potential tick slower relative to clocks far from masses or at rest. Telescopes sample the past light cone (we see the past); travelling to a distant system puts you in its local present. Both views coexist without contradiction.

Observers (operational). An observer is any physical interaction that entangles with a system (no consciousness required). Without interaction, evolution is unitary and supports interference; persistent, value-revealing interactions suppress interference (decoherence / quantum Zeno).

Quantum Observers and a No-Global-Observer Theorem

Theorem 1 (No-global, ever-measuring, noncontextual observer). *Assume:*

- (A1) *Standard quantum mechanics holds in the lab: unitary evolution for isolated systems, the Born rule, observed interference; experiments violate Bell/CHSH and the Kochen–Specker theorem rules out global noncontextual value assignments.*
- (A2) *There exists a single agent G that, for every system and all times, either (i) performs projective, value-revealing measurements without altering the statistics of isolated experiments, or (ii) assigns sharp, noncontextual values to all observables without disturbance.*

Then such a G cannot exist.

Proof sketch. Under (A2.i), continuous measurement would universally suppress interference in carefully isolated setups, contrary to observation. Under (A2.ii), global noncontextual value assignments contradict Bell/CHSH and Kochen–Specker. Hence no such G . \square

Corollary 1 (No noncontextual, ever-measuring omniscience). *A physics-loaded reading of singular, ever-measuring, noncontextual, value-revealing omniscience is incompatible with quantum mechanics.*

Remark (What remains compatible). This rules out a *specific* class of models. Models that (a) do not continuously measure, (b) allow contextual knowledge (no global noncontextual assignments), (c) “know” the quantum state without adding extra collapse, or (d) intervene locally with ordinary physical footprints, remain compatible with quantum mechanics.

Mapping to the \boxtimes -Algebra

- **Future = admissible set.** The world yields an option set R (e.g., set-valued division; $0/0 = S$ denotes the admissible option set, not a numeric infinity).
- **Present = selection.** A selector (policy/intent) chooses one element of R to realize.
- **Past = record.** The realized outcome is written into the environment; records proliferate and are hard to erase as entropy increases.
- **Relativity link.** Different observers left-fold their worldlines with different local conditions; there is no single global evaluation order, only frame-dependent proper time.

Remark (Compatibility with Hellenic polytheism). A plural, bounded, contextual pantheon fits naturally. Each deity acts as a policy/selector over an admissible option set R , intervening locally and sporadically. This avoids any global, ever-measuring, noncontextual omniscience while modeling oracular bias and “fate” as weights over R .