FOUNDATIONAL DEFINITIONS

Universe := Allowed States | Actual History

Allowed States (S):
- The complete set of configurations consistent with:
  - Conservation laws
  - Quantum consistency (unitarity)
  - Thermodynamics (global entropy non-decrease)
  - Relativistic causality
- No preferences, no memory, no structure
- Equivalent to a maximum-entropy description
- Describes what is possible, not what happened

Actual History (r):
- A single irreversible trajectory through S
- The record of excluded possibilities
- Constraint accumulation over time
- Source of time's arrow, structure, and identity

Universe (U):
- Not a thing, but a conditioned description:
  U = (S | r)
- Same underlying reality viewed with history retained
- Gravity, structure, and geometry encode memory of r

Maximum Entropy:
- Not separate from the universe
- The universe described without conditioning on history
- No direction, no structure, no identity
- "Nothing is distinguished"

Time:
- Emerges from irreversible exclusion of possibilities
- Not iteration of reality, but accumulation of constraints

Consistency Operator:
- Applies to descriptions, not reality
- Iterative refinement of models:
  D_{n+1} = Consistent(D_n)
- Fixed-point convergence of understanding
- Reality itself does not iterate

Error Correction (Foundational):

- Not repair, not protection by intent
- Stability via constraint closure:
  - Inconsistent states are excluded (hard rejection)
  - Allowed states form a closed set
- Soft stabilization via:
  - Entropy bias
  - Decoherence
  - Redundant encoding
  - Geometry as memory

Hard Rejection:
- Fundamental “health code” of reality
- States violating constraints never exist
- No correction phase, only exclusion

Core Insight:
Reality = What could be + What can no longer happen