

Section 6. Geometry Without Spacetime

This section develops a central implication of the CUWF multiverse framework: if parallel universes are distinguished by entropic accessibility rather than by location in an external container, then geometry itself must be redefined. What appears as distance, curvature, boundary, or dimensional structure inside a given universe is not fundamental spacetime architecture, but an emergent summary of the accessibility topology internal to a collapse-stabilized domain.

6.1 Multiverse as Entropic Topology

CUWF abandons the assumption that geometry is fundamentally spatial. Instead, geometry is reinterpreted as the topology of the entropic accessibility structure. Each universe-domain is identified with a connected component of the accessibility graph $G(\Xi_E)$, and the effective geometry perceived by observers within that domain arises from the pattern, density, and constraint structure of admissible relational transitions internal to that component.

Let D be a collapse-stabilized domain with accessibility graph G_D . The geometry experienced from within D is not an independently existing background in which states are placed. It is the metric projection of path-structure within G_D . Distance is an emergent summary of how many closure-preserving transitions separate one relational state from another. Curvature is an emergent expression of bottlenecks, anisotropies, and transition-density gradients within the graph. Dimensionality is not primitive, but a large-scale effective description of the degrees of relational freedom that remain accessible inside the closure.

In this picture, regions with high transition density may appear locally flat, because relational movement through the accessibility network remains abundant and weakly constrained. By contrast, sparse, constricted, or strongly filtered regions appear as high-curvature zones, horizon-like boundaries, or dynamically isolated sectors. Geometry is therefore not a container within which

collapse occurs. It is a stabilized record of how collapse has organized relational accessibility inside a given domain.

6.2 Universes Cannot Communicate Through Ξ -Orthogonality

The CUWF concept of parallel universes follows directly from this redefinition. If geometry is an internal projection of accessibility topology, then the separation between universes cannot be understood as spatial distance between two regions of a shared background. It must instead be understood as Ξ -orthogonality between distinct closure components.

Two domains D_1 and D_2 are Ξ -orthogonal when their admissible transition sets satisfy the condition $\Xi_E(D_1) \cap \Xi_E(D_2) = \emptyset$. This relation is stronger than ordinary spatial separation. It states that no closure-preserving transformation exists that maps relational states in D_1 into states admissible in D_2 while preserving the integrity of either domain. The issue is therefore not that signals must travel too far. The issue is that no admissible rule exists by which a signal could remain physically meaningful across both closures.

Any hypothetical cross-domain communication would require at least one transition T such that $T \in \Xi_E(D_1)$ and $T \in \Xi_E(D_2)$. Ξ -orthogonality forbids precisely this intersection. A signal meaningful in one domain has no closure-preserving extension into the other. Even though both domains belong to the same universal substrate Ω , they do not belong to the same accessibility graph. Coexistence at the level of substrate therefore does not imply communicability at the level of physics.

This yields the CUWF reformulation of the multiverse. The multiverse is not a partition of external space, nor a collection of universes separated by vast empty distances. It is a partition of accessibility topology within one foundational wave reality. Universes are parallel because their closure structures are mutually incompatible, not because they occupy different coordinates in a larger spacetime. What separates them is not where they are, but what transitions remain admissible from within them.