Projected Ontology Theory (POT): A Formal Statement

Core Hypothesis

Projected Ontology Theory (POT) posits that the fundamental ontological layer of the universe is not four-dimensional spacetime $\mathbb{R}^4$, but a higher-order Hilbert space referred to as **Hont** (Hilbert Ontology). Observable physical phenomena in $\mathbb{R}^4$ are projections of structured modal flows within this ontological space.

Key Constructs

- **Hont:** A separable, infinite-dimensional Hilbert space $\mathcal{H}$ whose elements are modal functions, potentially band-limited and constrained by physical symmetries.
- **Modal Flow:** A continuous evolution $\phi(\tau)$ of elements in $\mathcal{H}$ governed by internal dynamics and subject to spectral constraints.
- **Projection:** A mapping $\Pi : \mathcal{H} \to \mathbb{R}^4$ which defines the appearance of modal structures as observable physical fields, particles, and interactions.

Derived Ontology

- **Mass:** Arises from the residue of poles in the Fourier spectrum of the modal flow ϕ. It is ontological, not a property emergent from spacetime curvature.
- **Charge:** Emerges from phase winding numbers in modal functions, associated with topological features in Hont.
- **Time:** Is a projection of modal continuity; the apparent arrow of time arises from the directed evolution of modal sequences under projection.
- **Spacetime:** $\mathbb{R}^4$ is not fundamental but a structured image under Π of underlying modal states.

Projection Principles

- Projection kernels resemble Greens functions, convolving modal flow to generate observable dynamics.
- Projected observables (fields, particles) are filtered band-limited representations of modal bundles.
- The richness of physical diversity (e.g., stars, particles) is constrained by the bandwidth of modal flow.

Interpretive Commitments

- Ontological priority is given to modal structures in Hont, not to their projected appearances.
- Measurement and apparent locality in $\mathbb{R}^4$ are derivative phenomena.
- The Schrdinger equation and field theories in spacetime arise as effective projections of more fundamental modal dynamics.

Extensions

- Modal functions may be generalized from scalar-valued $\mathbb{C}$ to vector- or group-valued codomains $\mathbb{C}^n$, $SU(n)$, etc.
- Spin, flavor, and interaction structure emerge from internal symmetries in Hont.
- Projection geometry may yield nontrivial topology, leading to observable quantization and conservation laws.

Status

Projected Ontology Theory (POT) offers a non-spacetime ontological basis for fundamental physics, where observable reality is understood as a shadow of a structured and evolving Hilbert space.