

The Dimensional Nesting Hypothesis (DNH)

A Framework of Sequential Geometrical and Spatial Containment

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Abstract

The Dimensional Nesting Hypothesis (DNH) proposes a geometric and structural framework wherein reality is organized as an infinite series of sequentially nested spatial dimensions ($D_0 \rightarrow D_n$). Under this model, each lower dimension D_{n-1} serves as the foundational boundary layer or subspace of the immediate higher dimension D_n . The hypothesis introduces the *Principle of Informational Insulation*, asserting that lower-dimensional systems are structurally incapable of perceiving the orthogonal axes of their higher-dimensional containers. Consequently, interactions from higher dimensions manifest in lower dimensions exclusively as dynamic cross-sectional slices or geometric projections. This framework offers alternative conceptual explanations for quantum anomalies (such as tunneling) and macro-gravitational leaks by analyzing them as cross-dimensional boundary energy transfers.

1 Introduction

Human perception is inherently bound by the three spatial dimensions we occupy. Much like the theoretical inhabitants of Edwin A. Abbott's *Flatland*, our biological and technological sensory apparatus cannot measure a spatial axis strictly orthogonal to height, width, and depth. The Dimensional Nesting Hypothesis (DNH) addresses this limitation not by attempting to "visualize" higher dimensions, but by defining their structural relationship to our own.

2 The Core Framework: Fundamental Axioms

The DNH relies on three unbreakable rules governing dimensional interaction:

1. The Law of Orthogonal Ascension

Each dimension D_n is constructed by displacing the entirety of the lower dimension D_{n-1} along a novel, independent (orthogonal) axis. Mathematically:

$$D_n = D_{n-1} \times \hat{w}_n \quad (1)$$

where \hat{w}_n represents the new orthogonal basis vector.

2. The Principle of Informational Insulation

A lower dimension D_{n-1} lacks the geometric coordinates required to measure the extra-dimensional axis of D_n . Higher dimensions act as a “one-way mirror”; they contain the lower dimension, but remain invisible to it.

3. The Boundary Condition

The entirety of a lower-dimensional space D_{n-1} operates merely as the boundary surface (or membrane) of the higher-dimensional space D_n .

3 Mathematical Progression

This sequence can be formalized using standard vector spaces (\mathbb{R}^n), illustrating how spatial capacity expands logarithmically:

Dimension (D_n)	Geometric State	Vector Space	Added Component
0D	Point	$\mathbb{R}^0 = \{0\}$	Position (Static)
1D	Line	$\mathbb{R}^1 = \{x\}$	Magnitude (Length)
2D	Plane	$\mathbb{R}^2 = \{x, y\}$	Area (Width)
3D	Space	$\mathbb{R}^3 = \{x, y, z\}$	Volume (Depth)
4D	Hyperspace	$\mathbb{R}^4 = \{x, y, z, w\}$	Hypervolume (Orthogonal to 3D)
n D	Superspace	\mathbb{R}^n	Infinite sequential nesting

Table 1: Sequential spatial containment progression.

4 Cross-Sectional Mechanics

Because a 3D entity cannot enter 4D space directly, interactions manifest exclusively through **Projections** and **Cross-Sections**.

5 Solving Physical Anomalies

The DNH provides a novel lens for examining persistent physics anomalies:

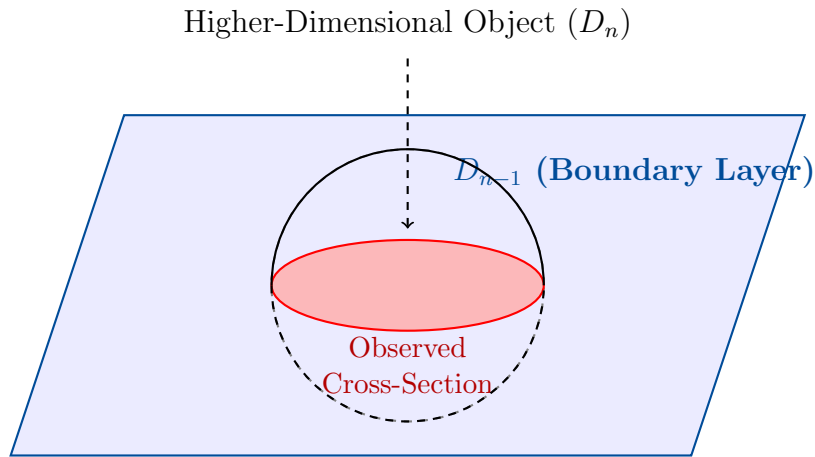


Figure 1: A higher-dimensional object intersecting a lower-dimensional boundary layer, producing a measurable but incomplete cross-section.

1. Quantum Tunneling

Instead of an immediate breach of a physical barrier in 3D space, tunneling may represent a particle briefly shifting into the w -axis (the 4D nest), bypassing the 3D obstacle completely, and returning to the 3D subspace.

2. Black Hole Singularities

Rather than mass crushing into an infinitely dense 0D point, intense localized gravity may puncture the 3D nested boundary, acting as a funnel that disperses matter and energy into the wider D_4 hyperspace, resolving the infinite density paradox.

This document serves as the foundational white paper for the Dimensional Nesting Hypothesis.