

# AETHIC REASONING

A New Solution to the Quantum Measurement Problem

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# Why Does Looking Change Reality?

The quantum measurement problem is the deepest open question in physics.

## Copenhagen

Collapse is real but unexplained.  
Requires an arbitrary quantum-classical boundary.

## Many-Worlds

No collapse — all outcomes real.  
Duplicates entire universes.  
Can't derive the Born rule.

## Aethic Reasoning

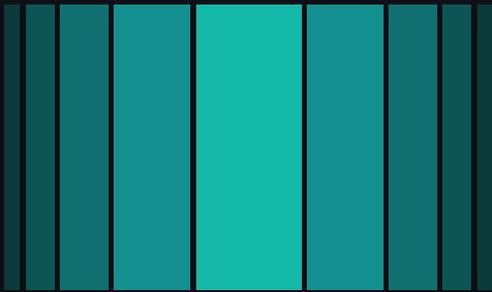
Collapse as logical constraint.  
Derived from first principles.  
No new entities required.

Core question: What rule determines whether we see interference or no interference?

# The Double-Slit Experiment

One particle, two slits. The pattern depends entirely on whether we look.

## Detector OFF



*Interference pattern*

→ Agreeing superposition

## Detector ON



*Two bands — no interference*

→ Disagreeing superposition

No energy added. No force exerted. The effect is purely informational.

## THE INSIGHT

To find the rule behind collapse,  
scale the experiment up to the macroscopic world —  
where the logic becomes visible.

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*Galois solved the quintic not by manipulating equations,  
but by examining the structure of roots.  
Aethic reasoning takes a similar shift in perspective.*

# Oliver's Soccer Field

A macroscopic translation of the double-slit experiment.

## The Setup

- › Oliver stands blindfolded on bleachers
- › A wall at midfield has two doors
- › 100 friends walk through a door to the far end
- › Oliver cannot see which door anyone uses

## By the Second Postulate

Which-door information is nonpresent to Oliver's Aethus.

The default Aethic state for unknown information is agreeing superposition.

## THE PARADOX

Oliver asks a friend: "Which door did you go through?" The friend answers: "Door 1."

But the interference pattern requires both doors at once. This creates an unavoidable Aethic contradiction — and it's only one question away.

# The Checkmate Rule

The mere possibility of contradiction is enough to prevent a state from existing.

## CHECK

An avenue to contradiction exists.  
The king is under threat — but escape  
may be possible.

$\exists C \subset A : \forall [C] \text{ fails}$

## CHECKMATE

Every possible move still leaves the  
threat reachable. No escape.  
The state is invalid from the start.

$\forall B \subset A, \exists C \subset B : \forall [C] \text{ fails}$

## THE THIRD POSTULATE

$V[A] \Rightarrow \exists B \subset A, \forall C \subset B, V[C]$

*"If a state is valid, there must exist an escape where every further move is safe."*

# The Extrusion Principle

What does a relational reality actually look like?

**The universe is not a single block universe, but a Markov chain of block universes.**

Each is a complete, static 4D spacetime consistent with relativity. Wavefunction collapse is not an event within a timeline — it is a transition between block universes, driven by your acquisition of new information.

## vs. Many-Worlds

Many-Worlds duplicates entire spacetimes with every quantum event.

Aethic reasoning keeps a single spacetime and navigates it perspectively.

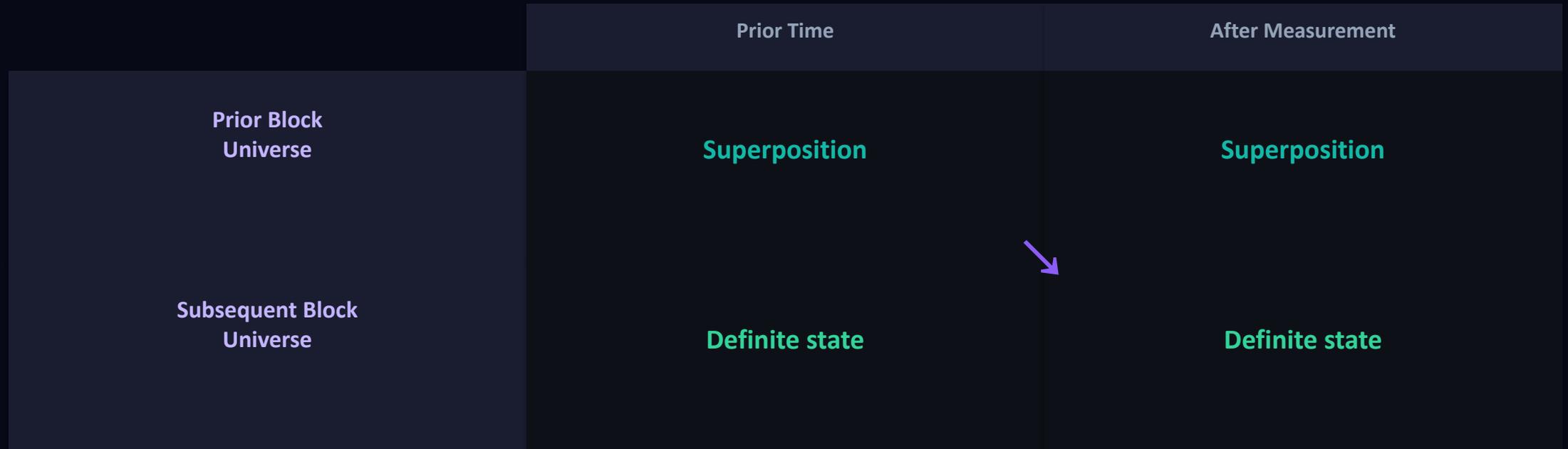
Extrusion without duplication.

***The particle never changed — your Aethus did.***

*Time's passage = your movement along the Markov chain, driven by information.*

# Collapse Reframed

Copenhagen says collapse is an event in time. Aethic reasoning says it's a transition between realities.



The diagonal ( $\searrow$ ) is what Copenhagen already describes. The Aethic insight is the cross-diagonal: in the prior block universe, the particle was always in superposition. In the subsequent, it was never in superposition.

## THE DERIVATION

Three postulates. One experiment.  
No collapse postulate assumed.

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*We now derive the outcome of the double-slit experiment  
from first principles — no quantum axioms required.*

# Deriving the Double-Slit: Detector OFF

1

## Apply 2nd Postulate

Which-slit info is nonpresent to the observer's Aethus. The system must be in Aethic superposition.

2

## Apply 3rd Postulate

Is agreeing superposition in checkmate? No — path info is permanently inaccessible. No check, no checkmate.

3

## Conclusion

Agreeing superposition stands. The particle genuinely traverses both paths. Paths interact → interference pattern.

✓ **Matches experiment: interference pattern observed.**

# Deriving the Double-Slit: Detector ON

1

## Default State

Which-slit info is nonpresent → 2nd Postulate gives agreeing superposition as default. But is it valid?

2

## Apply 3rd Postulate

Checkmate. No matter what Oliver does next, a contradiction is always reachable. No escape.

3

## Conclusion

Agreeing superposition is invalidated. System forced into disagreeing superposition → two bands, no interference.

✓ **Matches experiment: two-band pattern, no interference.**

# What We Just Derived

One logical constraint. One ontology. The entire observer effect.

## 2nd Postulate: Productive

Creates a universal default of agreeing superposition. Everything unknown is in superposition. The natural "resting state" of the universe.

## 3rd Postulate: Retractive

Prunes wherever checkmate holds. Agreeing superposition gives way to disagreeing. This is collapse — derived, not assumed.

**No collapse postulate was assumed. It was derived.**

# Beyond Two Slits

## The Powerset Invalidation Theorem

The three postulates classify every possible slit-combination for any multi-slit experiment — revealing structure hidden for a century.

### THE KEY OBJECT

#### Detector-Induced Equivalence Classes

Two slits are equivalent iff no detector can distinguish them. This groups slits into classes — and the valid superpositions are exactly these classes.

### THREE-WAY CLASSIFICATION

- Valid — Matches an equivalence class exactly
- P2 Invalid — Over-specifies within a class (2nd Postulate)
- P3 Invalid — Spans multiple classes (3rd Postulate)

*Mutually exclusive. Jointly exhaustive. No gaps. No overlaps.*

### FOUR-SLIT EXAMPLE

4 slits {A, B, C, D} · 1 detector fires on  $A \vee B$  → 2 equivalence classes: {A,B} and {C,D}

$\emptyset$	{A}	{B}	{C}	{D}	{A,B}	{A,C}	{A,D}
{B,C}	{B,D}	{C,D}	{A,B,C}	{A,B,D}	{A,C,D}	{B,C,D}	{A,B,C,D}

3 valid · 4 over-specifications (P2) · 9 contradictions (P3) = 16 total ✓

# The Quantum-Classical Boundary

Adding detectors splits equivalence classes — transforming P2 cases into valid ones while generating new P3 cases.

## No Detectors

All slits form one class.  
Only valid cases:  $\emptyset$  and the full set.  
All other subsets are P2.  
Zero P3 cases.

Pure interference



Add detectors

## Partial

Multiple classes.  
P2 and P3 coexist.  
Mixed quantum/  
classical behavior.

The general case



## Full Detection

Each slit = own class.  
Every singleton valid.  
No P2 cases.  
All multi-slit subsets  
are P3.

Pure particle pattern

## THE STRUCTURAL INSIGHT

The quantum-classical boundary is not a fixed threshold at some energy or scale. It is wherever the informational coupling between system and observer draws it. Move detectors, move boundary. The boundary is a property of the measurement, not of the physics.

# Where This Goes

## Falsifiable Predictions

If distinguishing information is made permanently unknowable, macroscopic outcomes should interact as if both occurred. A class of experiments can test this.

## Quantitative Physics

The framework encodes the Feynman path integral and the Born rule. Quantum mechanics emerges from logical constraints, not additional axioms.

## Beyond Quantum

The same Aethic ontology extends to anthropic reasoning, generating falsifiable paleontological predictions and a derivation of the Rare Earth hypothesis.

*Full paper and companion: [philarchive.org](http://philarchive.org)*

## THREE POSTULATES

1

Any attribution of realism is a statement of relation to a particular Aethus.

2

Any attribute is in Aethic superposition if and only if it is nonpresent. Superposition is the default.

3

$V[A] \Rightarrow \exists B \subset A, \forall C \subset B, V[C]$ . Validity requires an escape from check.

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*The strange rules of quantum mechanics are the elegant consequence of a universe that, above all else, makes sense.*