

What if the world isn't fixed, but continuously coming into being?

Rethinking the Foundations of Physics

How does physics change when we begin with relations instead of objects, and understand reality as something that unfolds, not something already fixed?

When we first learn physics, we are taught something simple.

The world is made of objects.
These objects have properties.
They move according to laws.

This way of thinking feels obvious.

But it creates a problem.

The hidden assumption

We assume that objects are already there.

We assume that:

- a system has a state
- laws act on that state
- the future is only determined by the past

But this assumes something we rarely question:
That the world is already *determinate*.

What if it isn't?

What if determinacy is not given?
What if it has to be *achieved*?

This changes the question.

Instead of asking:
What are the objects and laws?

we begin asking:
How does anything become determinate at all?

A distinction we usually miss

To answer this, we need a distinction.

Between:

- *form*
- *actuality*

Form is the structure of possibilities.

Actuality is what is realized.

We usually collapse these together.

But when we separate them, something becomes visible.

- Form consists of multiple general possibilities
- Actuality is one particular realization
- Determination is the process by which a general possibility becomes a particular actuality

The world is not built from objects

If form and actuality are distinct, then objects cannot be the starting point.

Because an object is already something determined.

Instead:

What comes first is a process that brings determination about.

Three processes that organize relations

To think this through, it helps to distinguish three interrelated movements:

- *synchronicity*
- *recursion*
- *return*

These are not things.

They are ways in which relations are organized.

Synchronicity

- Synchronicity establishes a shared condition.
- It allows different parts of a system to be present together.
- It creates a *frame* within which relations can be coordinated.

Recursion

- Recursion extends relations.
- It is the process by which something continues—step by step.
- It generates structure through repetition and variation.

Return

- Return closes the process.
- It takes what has been extended and brings it into unity.
- Without return, nothing becomes determinate.

What this means

Determination is not:

- imposed from outside
- fixed in advance

It is:

achieved through the coordination of these processes

Light as mediator

Within this framework, light plays a special role.

It is not just something that travels.

It mediates between:

- structure (form)
- unfolding (actuality)

It connects what can happen with what does happen.

Rethinking physics

Now familiar ideas begin to look different.

Relativity is no longer just about frames of reference.

It becomes a transformation of relational structure.

Uncertainty is no longer a limitation of measurement.

It expresses a constraint on incomplete processes.

Even equations like energy and mass relations are not just formulas.

They express a deeper identity within relational processes.

The role of the observer

Another shift follows.

We usually think of the observer as separate.

But here:

determination requires a condition in which relations are brought into unity

This condition is what makes a system actual *for an observer*.

Objects reconsidered

Now we can return to the beginning.

Objects are not primary.

They are:

outcomes of relational processes that have become stable.

In simple terms

The traditional view says:

The world is made of objects that follow laws.

The new approach suggests:

The world is made of relations that become determinate through process.

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The Breathing Manifold as Formal Icon

Up to this point, something important has shifted.

We are no longer thinking of the world as made of objects.
We are thinking of it as a process through which things become determinate.

But this raises a new question:

What does this process look like as a whole?

Not step by step.
Not one relation at a time.

But as a *single, unified form*.

Why we need a new image

If we try to imagine this process using familiar ideas, we run into trouble.

We might picture:

- a space filled with objects
- a timeline along which events unfold

But these pictures assume that:

- space is already given
- time is already laid out

And that is exactly what we have begun to question.

So we need a different way of thinking.

A manifold that breathes

To enter into this new way of thinking, suppose we introduce an unusual idea:

The world can be understood as a *breathing manifold*.

At first, this sounds metaphorical.
But it is meant quite precisely.

A manifold is a structured field—a way of organizing relations.

To say that it “breathes” is to say that:
it does not remain fixed
it moves between different states of organization

Two movements

This movement can be understood in two directions:

- *outward*
- *inward*

Outward: expansion

In one direction, the manifold opens.

Possibilities expand.
Relations are extended.

This is the side of:

- recursion
- unfolding
- generation

Nothing is yet fixed.

Inward: contraction

In the other direction, the manifold closes.

Relations are gathered.
Structure stabilizes.

This is the side of:

- return
- unity
- determination

Something becomes actual.

Breathing as coordination

The key point is not the two movements alone.

It is their coordination.

Determination happens when expansion and contraction are held together.

If there were only expansion:

- everything would remain possible
- nothing would become real

If there were only contraction:

- everything would be fixed
- nothing new could arise

The breathing manifold is the balance of both.

A different view of time

Now time begins to look different.

Instead of:

a line that is already there

time becomes:

the rhythm of expansion and contraction

Each moment is not just “after” the previous one.

It is:

- an opening of possibilities
- followed by a gathering into determination

A different view of space

Space also changes.

Instead of a container that holds objects:

space is the structure of relations as they expand and contract

Objects do not sit in space.

They appear when:

a pattern of relations stabilizes within this process

Light and the breathing manifold

Within this picture, light takes on a new role.

Light is not just something that moves through space.

Light participates in the breathing itself.

It connects:

- the expansion of possibilities
- with the contraction into determination

It is part of what allows the manifold to coordinate itself.

Why this matters

This idea may seem abstract, but it solves a real problem.

It shows how we can have both:

- lawful structure (as in physics)
- open-ended development (as in biology)

Without reducing one to the other.

Because both are moments within the same process:

the breathing of relational structure into determinate form

Connecting back

At this point, the earlier ideas come together.

- Determination is achieved, not given
- Objects are outcomes, not starting points
- Matter appears in stable patterns

The breathing manifold is the *larger frame* that makes all of this possible.

In simple terms

Instead of saying:

The world is made of things in space and time

we now say:

The world is a process that opens possibilities and gathers them into form.

Not a fixed world we move through,
but a world that comes into being—
again and again—through its own breathing.

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Rethinking Basic Categories

Up to this point, one central idea has emerged:

What we usually take as primary—objects, states, things—are not the starting point.

They are outcomes.

So now the question becomes:

What happens to our most basic concepts if we begin with relations instead?

Let us take them one at a time.

Light

We usually think of light as something that travels.

A thing that moves through space.

But in a relational framework, this is not the best place to begin.

Light is not just something that moves.

Light is what mediates between possibility and determination.

Light connects:

- what could happen
- with what becomes actual

It does not simply carry energy.

It participates in the coordination of relations.

So instead of:

Light is a moving object,

we say:

Light is a relational mediator that makes coordinated determination possible.

Space

We usually imagine space as a container.

A place where objects sit.

But this assumes that objects are already there.

If we begin with relations, this picture changes.

Space is not what contains relations.
Space is what relations form when they stabilize.

It is not given in advance.
It emerges as a structured field of relations.

So instead of:
Space holds objects,

we say:
Space is the organization of relations that allows things to appear as located.

Time

Time is usually treated as a line.
A sequence of moments that already exists.

But in a relational framework:

Time is not a container for events.
Time is the process through which relations become ordered.

It arises from:

- continuation (recursion)
- stabilization (return)

Time is the rhythm of:

- opening possibilities
- and gathering them into form

So instead of:
Time is a fixed sequence,

we say:
Time is the ordering of relational processes as they unfold and stabilize.

Matter

Matter is usually understood as substance.
Something that has properties and persists.

But if objects are outcomes, then matter cannot be primary.

Instead:
Matter is what appears when relational patterns become stable enough to persist.

It is not a thing underneath the process.
It is the result of the process holding together.

So instead of:
Matter is what things are made of,

we say:
Matter is the stabilization of relational structure into persistent form.

Event

We usually think of events as things that happen in time.
Discrete occurrences.

But in a relational framework:

An event is not something that happens *in* time.
An event is the achievement of determination within a process.

An event is the moment when:

- possibilities are gathered
- relations are coordinated
- something becomes actual

So instead of:
An event is a point in time,

we say:
An event is the resolution of relational processes into a determinate form.

Bringing it together

Now something important becomes visible.

All of these categories:

- light
- space
- time
- matter
- event

are no longer independent.

They are different aspects of the same underlying process.

- *Light* → mediates the process
- *Space* → expresses the structure of relations
- *Time* → expresses the unfolding of relations
- *Matter* → expresses the stabilization of relations
- *Event* → expresses the moment of determination

Together:

They describe how a relational process becomes a world.

What has changed

In the object-based view:

- space contains matter
- time orders events
- light moves through space

Each category is separate.

In the relational view:

These are not separate things.
They are different ways of describing one process.

In simple terms

Instead of saying:

The world is made of things in space and time,

we now say:

The world is a process in which relations:

- open (possibility)
- organize (structure)
- stabilize (form)

Not light in space,
 not matter in time,

but a single process
 in which relations become real.

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Rethinking the Observer

We usually imagine the observer in a very simple way.

There is:

- a world “out there”
- and an observer “looking at it”

The observer:

- measures
- records
- describes

But does not change what is observed.

This picture feels natural.

But once we move to a relational view, it begins to break down.

The observer is not outside the process

If the world is not made of fixed objects, but of relations becoming determinate, then there is no “finished world” to observe.

Instead:

Determination is something that is still being achieved.

And this means:

The observer cannot stand outside the process.
Because there is no outside.

Participation, not observation

So the role of the observer changes.

The observer is not someone who passively receives information.

The observer participates in the process through which something becomes actual.

This does not mean the observer “creates” reality in a simple sense.

It means:

*The observer provides
the condition under which relations are gathered into a determinate form.*

What does participation mean?

To observe something is to:

- select a frame
- establish a context
- bring certain relations into coordination

In doing so:

the observer helps stabilize one pattern rather than another

So observation is not neutral.

It is an act of constraint.

Einstein's Relativity

Now we can see why Einstein's insight becomes necessary.

Einstein tells us:

There is no absolute frame of reference.

This is taken to mean:

- no single frame has priority
- no frame stands above all the others

But that misses the deeper point.

No frame is complete in itself.

In a relational view:

A frame of reference is not a passive viewpoint.

It is a condition that organizes relations.

Different observers:

- establish different frames
- coordinate relations differently

And so:

what becomes determinate depends on the relational structure of the frame

Relativity is not just about measurement.

It is about:

how determination is situated within a relational process

Heisenberg's Indeterminacy

Now consider Heisenberg.

We are told:

You cannot measure position and momentum exactly at the same time.

This is often explained as a limitation:

- of measurement
- of knowledge

But again, something deeper is happening.

In a relational framework:

Position and momentum are not fixed properties waiting to be revealed.

They are:

different ways of organizing the same relational process

To measure one:

- you establish a constraint
- you stabilize a certain pattern

But in doing so:

you prevent another pattern from stabilizing

So indeterminacy is not ignorance.

It is:

a limit on how many relational structures can be made determinate at once

Observer as a point of return

We can now connect this to what we said earlier.

The process of determination involves:

- expansion (possibility)
- contraction (stabilization)

The observer participates in the *moment of contraction*.

The observer is a point at which relations are gathered into unity.

This is what we earlier called return.

Putting it together:

- The world is not fully determinate in advance
- Relations open into possibilities

- Determination requires stabilization

The observer:

- provides a frame
- constrains the process
- allows one pattern to become actual

So:

Observation is not passive.

Observation is part of how the world becomes determinate.

Instead of:

The observer measures a pre-existing world,

we now say:

The observer participates in the formation of a determinate world.

Relativity and indeterminacy, together

Einstein shows:

Determination depends on the relational frame.

Heisenberg shows:

Not all determinations can occur at once.

Together:

They describe the limits and conditions under which relational processes become actual.

In simple terms

- You are not outside the system
- You are part of the process
- What becomes real depends on how relations are organized

Not a world observed from the outside,
but a world brought into form
through participation.

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This is not just a reinterpretation—it is a change in what counts as an explanation

It may sound as if we have simply “re-described” familiar ideas:

- light
- space
- time
- observer

But something deeper has happened.

In the usual view, to explain something is to:

- identify objects
- assign properties
- apply laws

In the relational view:

To explain something is to show how a pattern of relations becomes stable.

So explanation shifts:

- from *what things are*
- to *how determination is achieved*

This is a different kind of explanation altogether.

Final cause re-enters—but in a new form

Modern science largely removed the idea of “final causes”—purposes or ends.

Everything is explained in terms of:

- initial conditions
- and efficient causes

But something has always been missing.

In a relational framework:

Determination depends on a process that *gathers relations into unity*
This looks like a kind of “end” or completion.

But it is not a goal imposed from outside.

It is:

a constraint that stabilizes the process from within

So final cause returns—not as purpose, but as:
the condition under which something becomes whole

Unity is not given—it is enacted

We often assume that systems are already unified.

A particle is one thing.
A system is one thing.

But this assumption is no longer valid.

In a relational framework:

Unity is something that must be *enacted within the process*

It happens when:

- relations are coordinated
- constraints are satisfied
- a stable pattern is formed

This is why the observer matters.

The observer participates in:
the enactment of unity through the coordination of relations

The deepest shift: from “what exists” to “what becomes determinate”

At the highest level, the relational framework changes the basic question.

Instead of asking:
What exists?

it asks:
How does anything become determinate at all?

This is a much more fundamental question.

Because existence, in the usual sense, already assumes:

- identity
- stability
- unity

But these are precisely what must be explained.

What this reveals

When all of this is taken together, something surprising appears.

Physics has not been missing data.

It has been missing a way of describing:
 how determination itself happens

This is why:

- relativity
- quantum mechanics

seem so difficult to reconcile.

They are not just different theories.

They are:
 partial views of the same underlying process

Why the “breathing manifold” matters

At this point, the idea of the breathing manifold becomes essential.

It is not just an image.

It expresses the fact that:

- the world is always opening (possibility)
- and closing (determination)

And that:
 reality exists only in the coordination of these two movements

This is not only about physics.

The same form appears in:

- biology (living systems stabilizing patterns)
- language (meaning emerging through relation)
- cognition (understanding as pattern formation)

So we are not just proposing a theory of the physical world.

We are proposing:
 a general account of how form becomes actual

What makes this difficult to see

The reason this framework is hard to grasp is simple.

We are trained to think in terms of objects.

So we constantly try to translate:

- relations → things
- processes → states

And in doing so:

we lose the very structure we are trying to understand

This framework is not telling us:

what the world is made of

It is showing us:

how anything becomes real at all

Not a world of things that simply exist,
but a world that must continuously
be brought into determination.

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Further Reading:

[*The Breathing Manifold and the Emergence of Physical Determination*](#)

[*How is a Relational Ontology Formally Relational? A phenomenological exploration of the semiotic logic of agency in physics, mathematics and biology.*](#)

[*From Natural Law to Relational Ordering: Unity as enacted, not intrinsically given*](#)

[*Determinacy as Relational Achievement: Symmetry, constraint and individuation in physics \(quantum mechanics\), biology \(biosemiotics\) and interactive formal systems \(Large Language Models\)*](#)

[*Three Reflections on Return: Convergence of form with regard to light \(physics\), life \(biology\), word \(semiotics/communications\)*](#)

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