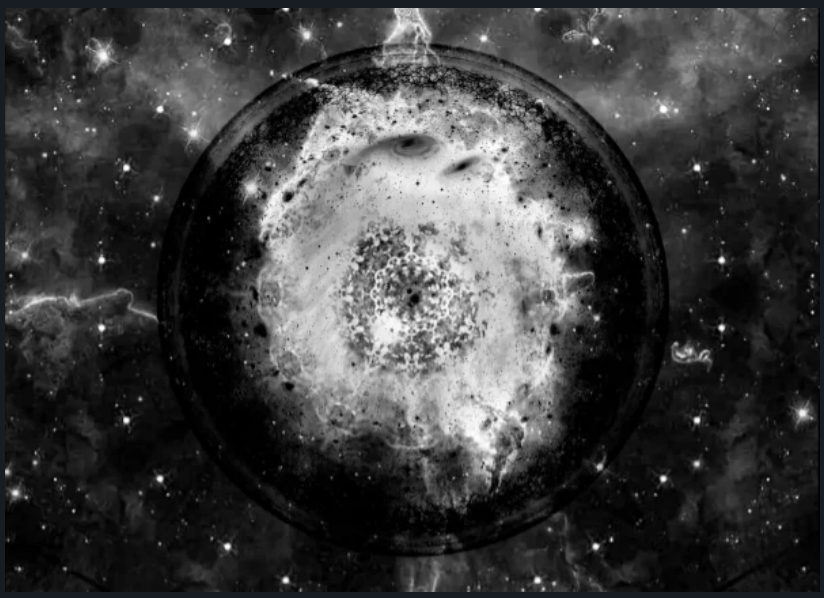
Cosmology

Ton Haarmans · Wide Open Windows



For a long time, mainstream physics and cosmology have worked as if the Laws of Nature exist independently of the universe in which we live, as if they precede it and govern it from some timeless outside. Within that framing, the laws look like external principles that set the universe in motion and shape it from the beginning. The ultimate hope has been to express these laws in a single, unifying formula: a theory so complete that even the so-called initial conditions would follow from it.

In This Is It I describe what appears. In Mindsets I describe how it appears. And in Origins I ask under what conditions anything like a world can appear at all. Cosmology enters this inquiry not as an answer-machine, but as a pressure test: it shows how quickly "the universe" turns into a model shaped by standpoint, measurement, and selection.

And this matters because an "origin" is not simply something that happened first. It is whatever makes a story of firstness possible and intelligible in the first place.

This traditional "bottom-up" approach, however, seems to have reached a dead end.

Physicists **Stephen Hawking** and **Thomas Hertog** turned this logic on its head in what they called "top-down cosmology." According to them:

> "The top-down approach we have described leads to a very different view of cosmology, and of the relationship between cause and effect. Top-down cosmology is a framework in which one essentially follows histories backward, from a spatial surface in the present age. The no-boundary histories of the universe thus depend on what is observed, as opposed to the usual idea that the universe has a unique history independent of the observer."

> S. W. Hawking & Thomas Hertog, “Populating the Landscape: A Top-Down Approach”

This view draws on quantum theory and its strange logic: a quantum state acquires a definite value only when it is measured, that is, when it is observed. Before observation, all potential values coexist in a kind of suspended simultaneity, a superposition of possibilities.

Seen in that light, the early universe, the so-called singularity from which space and time emerge, can be treated as a quantum system containing all possible configurations of matter, energy, and geometry at once. Yet only within a particular observational framework do specific “histories” become meaningful.

In other words, the beginning of the universe is not a single fixed event long ago, but a web of potential beginnings whose significance depends on the observational conditions we impose now.

In that sense, the Big Bang still happens now: not as a literal explosion unfolding in this moment, but as the ongoing actualization of the universe’s possible histories through our participation in it.

It follows that the way the universe appears to us is inseparable from the context in which we observe it. “Observation,” here, need not mean human consciousness alone; it refers to the physical conditions

that define a particular viewpoint within the whole. Whether one speaks of us as humanity, as biological organisms, or as consciousness itself remains an open question, but what is clear is that there is no purely external vantage point from which to describe reality “as it is.”

Another implication is that the so-called Laws of Nature are not immutable decrees living in a Platonic heaven. They may have evolved along with the universe, stabilizing through a kind of cosmic selection until they took the forms we now observe. This also means that the so-called “universal constants” might not always have been the same, and this raises a further possibility: some anomalies might reflect limits of our current frameworks rather than new ingredients in reality. Some recent proposals even argue for alternative explanations that aim to reduce or reinterpret the need for dark matter and dark energy.
(see: Rajendra P. Gupta, https://doi.org/10.3390/galaxies13050108).

> “Understanding the order of the universe and understanding its meaning are not identical, but they are not very far apart. … In our theory the universe is a grand synthesis. It is not one thing happening after another after another. It is a totality which includes us and in which what happens now gives reality to what happened in the past. Most people think that the world exists out

> there, independent of us. However, our theory shows that isn't the way the world works. We have taken a step back from the cold Copernican worldview that has dominated physics for several centuries and put mankind back in the centre”
>
> Stephen Hawking, 2015

This doesn't mean that Hawking supports a literally anthropocentric universe.

Still, most physicists, Hawking and Hertog included, continue to seek a unified theory in which the quantum forces and gravity merge, and where the laws of nature themselves arise from the theory. Yet I suspect this hope will remain unfulfilled.

It is impossible to step outside the universe to see it whole, for there is no outside, not for us. We are part of this same unfolding, part of the very system we attempt to understand.

Like a hammer that cannot strike itself, the universe can never render itself entirely transparent. There will always be irregularities, paradoxes, and edges that do not fit the frame.

The universe is not a tidy equation, nor a tidy place.

It is a moving boundary between what can be framed and what cannot.