archive.today
webpage captureSaved from <https://www.newscientist.com/article/2512894-we-have-a-new-way-to-explain-why-we-agree-on-the-nature-of-reality/>

search

27 Jan 2026 10:19:40 UTC

All snapshots from host www.newscientist.com

no other snapshots from this url

Webpage

Screenshot

share

download .zip

report bug or abuse

Buy me a coffee

NewScientist

Curiosity
Engine

Events Tours Shop

News Features Newsletters Podcasts Video Comment Culture Games | **This week's magazine**Health Space **Physics** Technology Environment Mind Humans Life Mathematics Chemistry Earth Society

Explore our newsletters

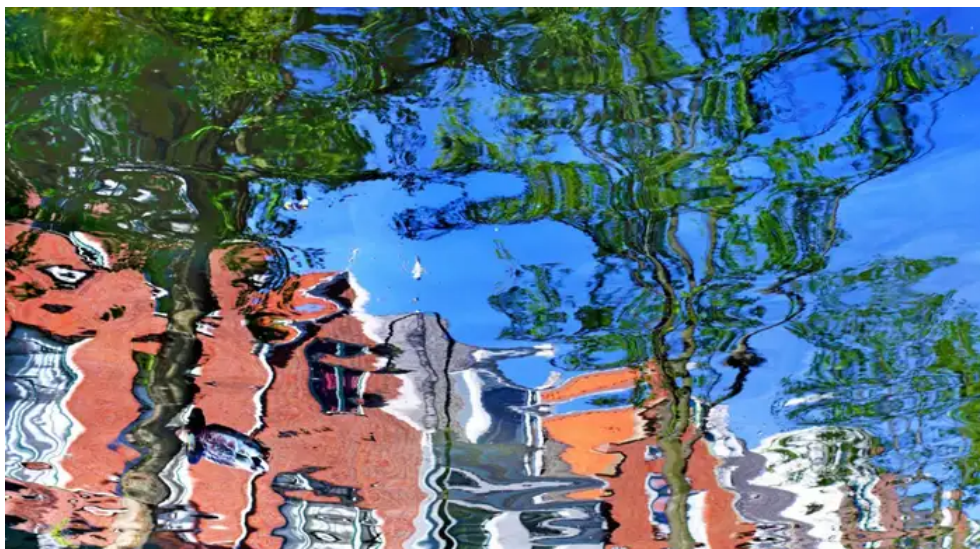
Physics

We have a new way to explain why we agree on the nature of reality

An evolution-inspired framework for how quantum fuzziness gives rise to our classical world shows that even imperfect observers can eventually agree on an objective reality

By [Karmela Padavic-Callaghan](#)

27 January 2026





▲ We can usually agree what objects look like, but why?

Martin Bond / Alamy

Our world seems to be [fundamentally fuzzy](#) at the quantum level, yet we do not experience it that way. Researchers have now developed a recipe for measuring how quickly the objective reality that we do experience emerges from this fuzziness, strengthening the case that a framework inspired by evolutionary principles can explain why it emerges at all.

In the quantum realm, each object – such as a single atom – exists in a cloud of possible states and assumes a well-defined, or “classical”, state only after being measured or observed. But we observe strictly classical objects free of existentially fuzzy parts, and the mechanism that makes this so has long [puzzled physicists](#).

In 2000, [Wojciech Zurek](#) at Los Alamos National Laboratory in New Mexico proposed “[quantum Darwinism](#)”, where a process similar to natural selection would ensure that the states of objects that we see are those that are most “fit” among all of the many states that could exist, and therefore best at replicating themselves through their interactions with the environment on their way to an observer. When two observers that only have access to fragments of physical reality agree on something objective about it, it is because they are both observing one of these identical copies.

Read more [How a quantum innovation may quash the idea of the multiverse](#)

[Steve Campbell](#) at University College Dublin and his colleagues have now proved that different observers are likely to agree on an objective reality even if the way they gather information about an object – the way they observe it – is not the most sophisticated or optimally precise.

“If one observer captures some fragment, they can choose to do whatever measurement they want. I can capture another fragment, and I can choose to do whatever measurement that I want. So how is it that classical objectivity arises? That’s where we started,” he says.

The researchers recast the problem of objectivity’s emergence as a problem in quantum sensing. If the objective fact at hand is, for example, the frequency at which an object shines light, then the

observers must obtain accurate information about that frequency, in a similar way to [how a computer equipped with a light sensor would](#). In the best-case scenario, this set-up could capture super-precise measurements and quickly reach a definitive conclusion about light's frequency – a scenario quantified by a mathematical formula called “quantum Fisher information”, or QFI. In the new work, the researchers used QFI as a benchmark against which they could compare how different, less precise observation schemes reach the same, accurate conclusions, says team member [Gabriel Landi](#) at the University of Rochester in New York state.

Strikingly, the team's calculations showed that for big enough fragments of physical reality, even observers doing imperfect measurements could eventually gather enough information to reach the same conclusions about objectivity as the ideal QFI standard.

Read more [We've discovered a door to a hidden part of reality – what's inside?](#)

“A silly measurement can actually do as well as a much more sophisticated measurement,” says Landi. “That's one way of seeing the emergence of classicality: when the fragments become big enough, observers start agreeing even with simple measurements.” In this way, the work offers another step towards understanding why when we observe our macroscopic world, we agree on its physical properties, such as the colour of a cup of coffee.

“The work highlights that perfect, ideal measurements are not required,” says [Diego Wisniacki](#) at the University of Buenos Aires in Argentina. He says that QFI is a mainstay of quantum information theory but it hadn't been introduced into quantum Darwinism before, so it could bridge this still rather theoretical quantum framework with well-established experiments – for example, in quantum devices with light-based or superconducting qubits.

“This is one more ‘brick’ in our understanding of quantum Darwinism,” says [G. Massimo Palma](#) at the University of Palermo in Italy. “And is a way [of studying it] which is closer to an experimentalist's description of what you actually observe in a lab.”

The bold attempt to solve

the toughest mystery at the heart of physics

Finding out whether gravity – and therefore space-time itself – is quantum in nature has long been thought impossible. But innovative new ideas might be about to help answer this crucial question

The model the researchers used in their study is very simple, so while their method may open doors to new experiments, calculations for more complex systems will be needed to put quantum Darwinism on even firmer foundations, he says. “It would be a really great breakthrough if we could go beyond simple toy models,” says Palma.

Landi says the researchers are already interested in turning their theoretical investigations into an experiment – for example, with qubits made from [trapped ions](#), where they could see how the timescale for the emergence of objectivity compares to the specific times during which those qubits are known to [keep their quantumness](#).

Journal reference: *Physical Review A* DOI: [10.1103/hn78-7xx3](#)

Topics: [Quantum Physics](#)

More from New Scientist

Explore the latest news, articles and features

Physics

The edge of the quantum world just moved closer to our reality

News

Physics

Embracing quantum spookiness: Best ideas of the century

Features

Humans

New Scientist’s guide to the 21 best ideas of the 21st century

Features

Physics

Our elegant universe: rethinking nature’s deepest principle

Features

Popular articles

Trending New Scientist articles

1

The daring idea that time is an illusion and how we could prove it

2

Embracing sauna culture can lower dementia risk and boost brain health

3

Why did magic mushrooms evolve? We may finally have the answer

4

Menstrual pad could give women insights into their changing fertility

5

The best map of dark matter has revealed never-before-seen structures

6

The 3 best ways to tackle anxiety, according to a leading expert

7

Mars's gravity may help control Earth's cycle of ice ages

8

Peter F. Hamilton's latest is an epic slice of sci-fi – with one flaw

9

Stick shaped by ancient humans is the oldest known wooden tool

10

New Scientist's guide to the 21 best ideas of the 21st century

Download the app

Find us on social media

Instagram

Facebook

X / Twitter

Tiktok

LinkedIn

BlueSky

Subscriptions

Subscriber benefits

Gift

Student & graduate

Educational

Corporate

Support

Contact us

FAQs

About us

Press room

Advertise

Write for us

Tools

Events

CoLab

Syndication

RSS feeds

Legal and privacy

Complaint policy

Privacy policy

Cookie policy

Terms & conditions

Cookie Settings

© Copyright New Scientist Ltd.

Back to the top



Tools that stay ahead.

Save 50%. First three months.

Buy now

Adobe Creative Cloud Pro