

ADVERTISEMENT



Newsletters in your inbox!

SUBSCRIBE

SPACE AND PHYSICS

PHYSICS

PUBLISHED 5 hours ago

Physicist Studying SARS-CoV-2 Virus Believes He Has Found Hints We Are Living In A Simulation

Studying the evolution of the virus, he found signs that the information entropy decreased over time.



JAMES FELTON

Senior Staff Writer



Edited by [Maddy Chapman](#)

DOWNLOAD PDF VERSION

9 Comments 240 Shares



Studying the information entropy of SARS-CoV-2 led Vopson to his idea. Image credit: Ninc Vienna/Shutterstock.com

A physicist studying mutations of the SARS-CoV-2 virus claims to have found evidence for a new law of physics termed the "second law of Infodynamics", and that it could indicate we are living in a simulated universe. On top of that, he suggests the study appears to imply that the theory of evolution is incorrect, with mutations not being entirely random.

There's a lot to unpack here. The first thing to say is that extraordinary claims require extraordinary evidence, and so far – as Dr Melvin Vopson explains in his work – we do not have that at all. In fact, we aren't even close. However, the ideas and results presented are intriguing and interesting, even if further study or scrutiny proves them incorrect.

In his [latest study](#), Vopson looked at mutations in the SARS-CoV-2 virus from an information entropy (a term distinct from usual entropy) perspective.

"The physical entropy of a given system is a measure of all its possible physical microstates compatible with the macrostate," Vopson explained in the paper. "This is a characteristic of the non-information bearing microstates within the system. Assuming the same system, and assuming that one is able to create N information states within the same physical system (for example, by writing digital bits in it), the effect of creating a number of N information states is to form N additional information microstates superimposed onto the existing physical microstates. These additional microstates are information bearing states, and the additional entropy associated with them is called the entropy of information."

While entropy tends to increase over time, information entropy tends to decrease, according to Vopson. An illustration of this would be the heat death of the universe, where the universe reaches a state of thermal equilibrium. At this point, entropy has reached its maximum value, but not information entropy. At this heat death (or just before), the range in temperatures and possible states in any area of the universe is very small, meaning that fewer events are possible and less information can be superimposed, making information entropy lower.

20%

Is information the fifth form of matter? | Life Solved



Share



While interesting as a way of describing the universe, can it tell us anything new, or are we just seeing a secondary but unimportant way of describing entropy? According to Vopson, the idea is a physical law that could govern everything from genetics to the evolution of the universe.

"My study indicates that the second law of infodynamics appears to be a cosmological necessity. It is universally applicable with immense scientific ramifications," Vopson wrote in [The Conversation](#). "We know the universe is expanding without the loss or gain of heat, which requires the total entropy of the universe to be constant. However we also know from thermodynamics that entropy is always rising. I argue this shows that there must be another entropy – information entropy – to balance the increase."

Vopson looked at the SARS-CoV-2 virus as it has mutated through the COVID-19 pandemic. The virus has been regularly sequenced, to keep an eye on how it is changing, largely in order to develop new vaccines. Looking at the RNA, not DNA, he found that the information entropy decreased over time.

"The best example of something that undergoes a number of mutations in a short space of time is a virus. The pandemic has given us the ideal test sample as SARS-CoV-2 mutated into so many variants and the data

available is unbelievable," Vopson explained in a [press release](#).

"The COVID data confirms the second law of infodynamics and the research opens up unlimited possibilities. Imagine looking at a particular genome and judging whether a mutation is beneficial before it happens. This could be game-changing technology which could be used in genetic therapies, the pharmaceutical industry, evolutionary biology, and pandemic research."

Melvin Vopson - Talking about Information Physics



To Vopson, this suggests that mutations are not random, but governed by a law that states that information entropy must stay the same or decrease over time. This would be an astonishing find if confirmed, overturning how we believe evolution works, but Vopson points to a similar experiment in 1972 which saw an unexpected reduction in the genome of a virus over 74 generations while in ideal conditions, which he suggests is consistent with his second law of infodynamics.

"The worldwide consensus is that mutations take place at random and then natural selection dictates whether the mutation is good or bad for an organism", he explained. "But what if there is a hidden process that drives these mutations? Every time we see something we don't understand, we describe it as 'random' or 'chaotic' or 'paranormal', but it's only our inability to explain it."

"If we can start looking at genetic mutations from a deterministic point of view, we can exploit this new physics law to predict mutations - or the probability of mutations - before they take place."

Vopson believes that the law could also explain why symmetry appears so abundantly in the universe.

"A high symmetry corresponds to a low information entropy state, which is exactly what the second law of infodynamics requires," Vopson wrote in his paper. "Hence, this remarkable observation appears to explain why symmetry dominates in the universe: it is due to the second law of information dynamics."

The bold claims (with their requirement for further evidence) do not stop there.

"Since the second law of infodynamics is a cosmological necessity, and appears to apply everywhere in the same way, it could be concluded that this indicates that the entire universe appears to be a simulated construct or a giant computer," Vopson adds in *The Conversation*.

"A super complex universe like ours, if it were a simulation, would require a built-in data optimisation and compression in order to reduce the computational power and the data storage requirements to run the simulation. This is exactly what we are observing all around us, including in digital data, biological systems, mathematical symmetries and the entire universe."

This doesn't mean that confirmation of the "second law of infodynamics" would prove we are [living in a simulation](#) - it's possible that the theory could be correct without that being the case. There are other quantum mechanical effects that [appear to prove](#) we are not.

So, how can we test this all further? If infodynamics is correct, information should have mass, allowing it to interact with everything else. There are hints this could be the case, such as that irreversible erasure of information appears to dissipate heat, according to a [study conducted in 2012](#). For Vopson, this indicates that this energy must be stored as mass prior to erasure, making information a [separate state of matter](#) equivalent to mass and energy.

Proving or disproving that information has mass may not be too difficult to do experimentally. One simple experiment would be to [measure the mass](#) of a hard drive before and after irreversible information erasure. Unfortunately, this is currently beyond our capabilities given the small amount of mass change expected.

But according to Vopson, if this theory is true, elementary particles would likely carry information about themselves. For instance, letting an electron (or maybe the universe's [only electron](#)) know its properties, such as its charge and spin. One proposed experiment is to send particles and antiparticles at each other at high speeds.

"The experiment involves erasing the information contained inside elementary particles by letting them and their antiparticles (all particles have 'anti' versions of themselves which are identical but have opposite charge) annihilate in a flash of energy - emitting 'photons', or light particles," Vopson [added](#). "I have predicted the exact range of expected frequencies of the resulting photons based on information physics."

While the idea is out of the mainstream, the experiment is relatively cheap at [\\$180,000](#) (absolutely nothing to simulation theory proponents such as [Elon Musk](#)), and testable with current technology. Sure, it might just tell us that the idea is incorrect, but it seems like an interesting idea to look into, and rule it out, or find out whether it has weight (or, more precisely, mass).

ARTICLE POSTED IN

[SPACE AND PHYSICS](#)

[PHYSICS](#)



[DISCUSS \(9 COMMENTS\)](#)

[MASS](#), [PHYSICS](#), [ENTROPY](#), [SIMULATION](#), [INFORMATION](#), [INFORMATION TECHNOLOGY](#), [COVID-19](#), [SARS-COV-2](#)

FOLLOW ON [Google NEWS](#)

Popular in the Community

Man Forgot Password To Acce...

Max Kennedy

"The only problem is that the owner isn't..."

Top Comment 4

New Solution To The Fermi Paradox...

Chris

I think this is plausible but doesn't need to..."

Top Comment 1

The Strange Theory That There Is Only...

OrangeTree

Maybe he was onto something. If were to..."

Top Comment

Our Community





1,165

Comments posted on IFLScience this month

Comment

Conversation 9 Comments

1.6K Viewing

Your voice matters. Discussions are moderated for civility and are subject to [our policy](#).

Commenting as **Guest**

Log in Sign up

What do you think?



Sort by **Best**

W **Webtelly**

3 hours ago

This feeds into one misconception about bioinformatics, which is that everything is new. Examples are the evolution series on National Geographic which deal with convergent or divergent species on different islands, which do not acknowledge that every evolutionary combination has already been achieved, and emerging variants could simply be reversions. Same with viruses.

Reply · 2 · Share

OE **Observer Effect**

2 hours ago

First: You can't decide that entropy isn't increasing for the universe simply because of one aspect of it seeming to contradict it. It likely simply a complex part of the "ups and downs" can happen within the larger picture.

Second: This sounds like a convoluted overblown rationalization for "intelligent design", creationist type trope.

Reply · 3 · Share

AD **A Dog**

34 minutes ago

Agreed, "to imply that the theory of evolution is incorrect" is nonsense. There are several different types of mutational events with known biases. Having a bias in mutational frequency or location is not antithetic to evolutionary theory.

Reply · 1 · Share

T **Thoughtbubble**

2 hours ago

I don't know if it's a good thing to prove we are living in a simulation. I think that's what being simulated - how long does it take for the lifeforms to realize and scientifically prove they are living in a simulation? Once we prove it, there is no point in running the simulation anymore, since our behavior will change based on knowledge of the simulation. That's when the simulation is ended and starts over from the beginning again.

Reply · 2 · 1 · Share

E **eyeroll**

42 minutes ago

No one ever claimed that mutation was "entirely random". More over, as a physicist he should understand that "entirely random" is a nonsense term outside the quantum world. Mutations and everything else in a deterministic universe is at best pseudo-random, which simply means we can't calculate all the multitude of variables that go into the deterministic outcome. Long story short, and as a fan of the simulation hypothesis being true, I press X to doubt this dude and his claim.

Reply · 1 · Share

70%

X **Xc** 1 hour ago ...

Why do we think that simulation is done by our "primitive" computers so they need to compress data, optimize, etc.? If there is smth like that they sure are not doing it with our limited knowledge and running it on windows milenimu heh

Reply · Like · Retweet 1 · Share

T **TehDJ** 5 minutes ago ...

I'm guessing the N2O canister valve was open while this was being brainstormed.

Reply · Like · Retweet · Share

M **Me** 32 minutes ago ...

Someone is watching too much japanese anime...

Reply · Like · Retweet · Share

Powered by OpenWeb

[Terms](#) | [Privacy](#) | [Feedback](#)

More Space and Physics Stories



PHYSICS

The Great Pyramid's Latitude Is (Coincidentally) The Same As The Speed Of Light

1 hour ago

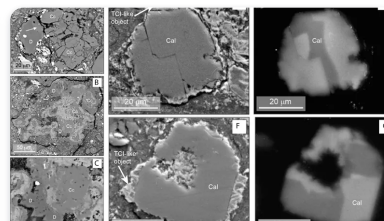


ASTRONOMY

NASA's Ingenuity Team Receives Final Message, But The Mars Helicopter Is Not Dead Yet

7 hours ago

66



ASTRONOMY

The Winchcombe Meteorite Had A Wet And Wild Journey To Earth

Yesterday

54

IFL



The **IFL** Newsletter

Sign up today to get weekly science coverage direct to your inbox

[SUBSCRIBE TODAY](#)

NAVIGATION

- [Home](#)
- [Team](#)
- [About](#)
- [Careers](#)
- [Subscribe](#)

CONTACT

- [Submit News](#)
- [Contact](#)
- [Report Website Issues](#)
- [Advertise With Us](#)
- [Write For Us](#)

EDITORIAL

- [Editorial Mission](#)
- [Fact-Checking Policy](#)
- [Correction Policy](#)
- [Transparency Policy](#)
- [Comment Policy](#)

LEGAL

- [Terms of use](#)
- [Privacy Policy](#)
- [Cookie Policy](#)
- [Change Cookie Settings](#)
- [Advertising Policy](#)

100%