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# SUNDAY EXPRESS

## The theory of everything: The universe is 'like a COMPUTER underlined by information'

SCIENTISTS are uncovering what underlies the universe and what makes up spacetime.

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Since Albert Einstein established his General Theory of Relativity 100 years ago, scientists have been at odds as to how it merges with quantum mechanics – all of the fundamental particles, including the ones that have yet to be discovered and three of the four interactions: electromagnetism, and the weak and strong nuclear forces.

The fourth interaction, gravity, which falls into Einstein's theory, does not match with quantum mechanics, leaving scientists unable to establish a Theory of Everything that unify the both

However, by digging to the very depths of reality, scientists are on the brink of discovering what makes up reality and how spacetime – the model that combines space and time – emerges.

Their theory is that information, to put it simply, underlies and makes the universe.



The universe is like a computer



Information underlies the universe

While that sounds like an uncontroversial understatement, what scientists mean by information is a theoretical series of numbers.

This would mean that the universe is basically written in binary – zeros and ones.



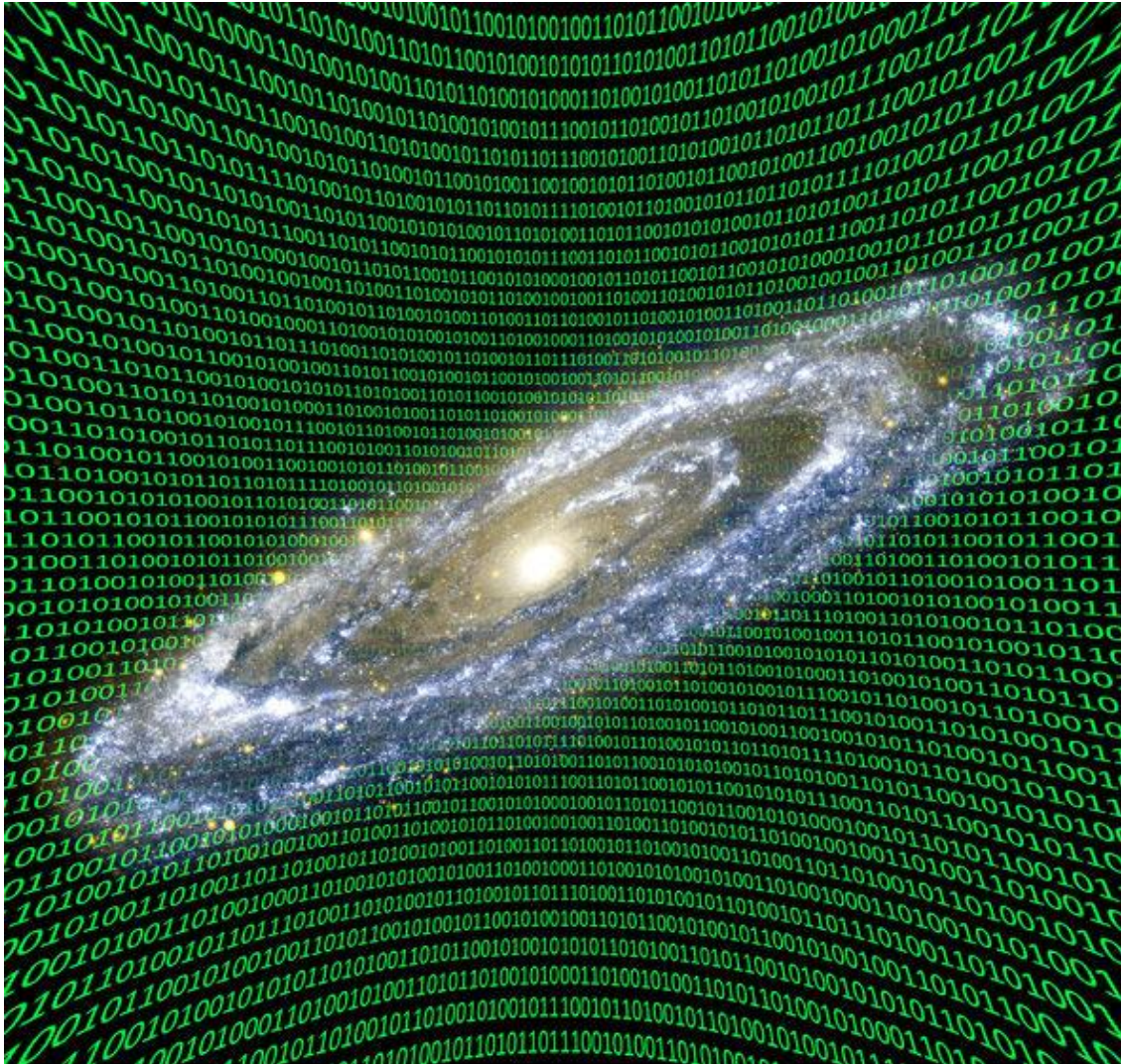




Binary underlies the universe

In 1948, mathematician and engineer Claude Shannon related information as a stream of numbers to entropy – the measure of chaos.

He said that the chaos of the numbers relates to how much information they carry. For example, 000 carries less information than 101, according to New Scientist.



Binary information underlies the universe

Sean Carroll of the California Institute of Technology (CalTech) told the magazine that it “is simply our best mathematical description of the universe.”

He added: “You can find people who think that information is all there is.”

Seth Lloyd, a Massachusetts Institute of Technology professor specialising in quantum information, told Space that the universe is like a computer, “a physical system that breaks up information into bits, and flips those bits in a systematic fashion.”

He added: “So, what is the universe? The universe is a physical system that contains and processes information in a systematic fashion and that can do everything a computer can do.”

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