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Is the Universe Conscious?

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GREATNESS AWAITS

Some of the world's most renowned scientists are questioning whether the cosmos has an inner life similar to our own.



June 16, 2017, 12:32 PM EDT / Updated June 16, 2017, 11:32 AM EDT **By Corey S. Powell**

For centuries, modern science has been shrinking the gap between

humans and the rest of the universe, from Isaac Newton showing that one set of laws applies equally to falling apples and orbiting moons to Carl Sagan intoning that "we are made of star stuff" – that the atoms of our bodies were literally forged in the nuclear furnaces of other stars. Even in that context, Gregory Matloff's ideas are shocking. The

veteran physicist at New York City College of Technology recently

published a paper arguing that humans may be like the rest of the universe in substance and in spirit. A "proto-consciousness field" could extend through all of space, he argues. Stars may be thinking entities that deliberately control their paths. Put more bluntly, the entire cosmos may be self-aware. The notion of a conscious universe sounds more like the stuff of late night TV than academic journals. Called by its formal academic name, though, "panpsychism" turns out to have prominent

supporters in a variety of fields. New York University philosopher

and cognitive scientist David Chalmers is a proponent. So too, in

for his work on gravity and black holes. The bottom line, Matloff

argues, is that panpsychism is too important to ignore.

different ways, are neuroscientist Christof Koch of the Allen Institute

for Brain Science, and British physicist Sir Roger Penrose, renowned

"It's all very speculative, but it's something we can check and either validate or falsify," he says. Three decades ago, Penrose introduced a key element of

panpsychism with his theory that consciousness is rooted in the statistical rules of quantum physics as they apply in the microscopic spaces between neurons in the brain. In 2006, German physicist Bernard Haisch, known both for his

studies of active stars and his openness to unorthodox science, took

Penrose's idea a big step further. Haisch proposed that the quantum fields that permeate all of empty space (the so-called "quantum vacuum") produce and transmit consciousness, which then emerges in any sufficiently complex system with energy flowing through it. And not just a brain, but potentially any physical structure. Intrigued, Matloff wondered if there was a way to take these squishy arguments and put them to an observational test. Related: What Einstein and Bill Gates Teach Us About Time Travel

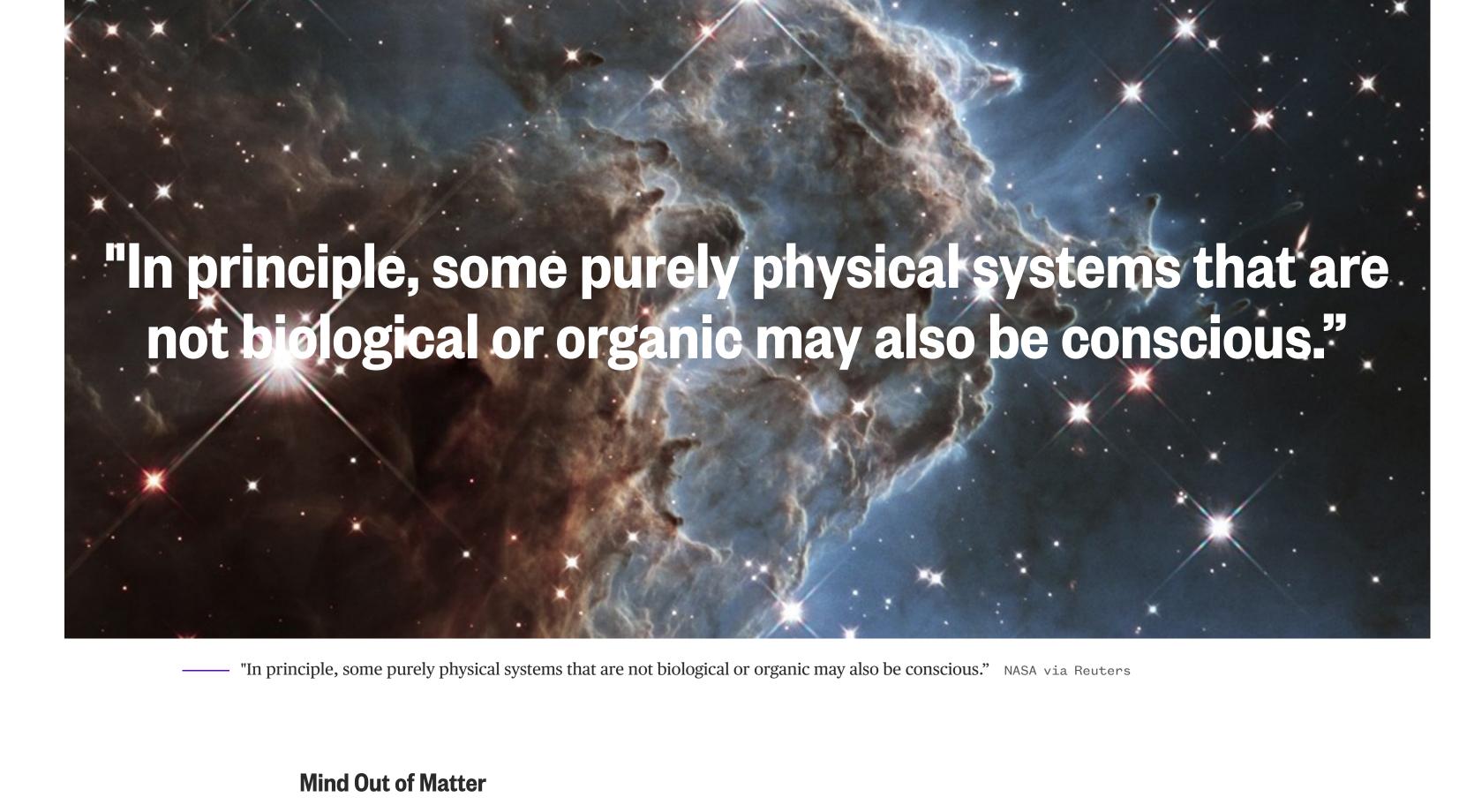
One of the hallmarks of life is its ability to adjust its behavior in response to stimulus. Matloff began searching for astronomical objects that unexpectedly exhibit this behavior. Recently, he zeroed

in on a little-studied anomaly in stellar motion known as Paranego's Discontinuity. On average, cooler stars orbit our galaxy more quickly than do hotter ones. Most astronomers attribute the effect to interactions between stars and gas clouds throughout the galaxy. Matloff considered a different explanation. He noted that the anomaly appears in stars that are cool enough to have molecules in their atmospheres, which greatly increases their chemical complexity. Matloff noted further that some stars appear to emit jets that point in only one direction, an unbalanced process that could cause a star to alter its motion. He wondered: Could this actually be a willful

If Paranego's Discontinuity is caused by specific conditions within the galaxy, it should vary from location to location. But if it is something intrinsic to the stars – as consciousness would be – it should be the same everywhere. Data from existing stellar catalogs seems to support the latter view, Matloff claims. Detailed results

process? Is there any way to tell?

from the Gaia star-mapping space telescope, due in 2018, will provide a more stringent test. Matloff is under no illusion that his colleagues will be convinced, but he remains upbeat: "Shouldn't we at least be checking? Maybe we can move panpsychism from philosophy to observational astrophysics."



While Matloff looks out to the stars to verify panpsychism, Christof Koch looks at humans. In his view, the existence of widespread, ubiquitous consciousness is strongly tied to scientists' current

understanding of the neurological origins of the mind. "The only dominant theory we have of consciousness says that it is associated with complexity – with a system's ability to act upon its

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own state and determine its own fate," Koch says. "Theory states that it could go down to very simple systems. In principle, some purely physical systems that are not biological or organic may also be conscious."

Koch is inspired by integrated information theory, a hot topic among modern neuroscientists, which holds that consciousness is defined by the ability of a system to be influenced by its previous state and to influence its next state.

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The human brain is just an extreme example of that process, Koch

explains: "We are more complex, we have more self-awareness –

well, some of us do – but other systems have awareness, too. We

consciousness is: the ability to experience anything, from the most

may share this property of experience, and that is what

mundane to the most refined religious experience."

stratification?

Related: Cosmic Bruise Could be Evidence of Multiple Universes Like Matloff, Koch and his colleagues are actively engaged in experimental tests of these ideas. One approach is to study brain-

impaired patients to see if their information responses align with

biological measures of their consciousness. Another approach,

further off, is to wire the brains of two mice together and see how the integrated consciousness of the animals changes as the amount of information flowing between them is increased. At some point, according to integrated information theory, the two should merge into a single, larger information system. Eventually, it should be possible to run such experiments with humans, wiring their brains together to see if a new type of consciousness emerges. Despite their seeming similarities, Koch is dubious of Matloff's volitional stars. What is distinctive about living things, according to his theory, is not that they are alive but that they are complex.

mathematical perspective it is also vastly simpler. Koch allows that a

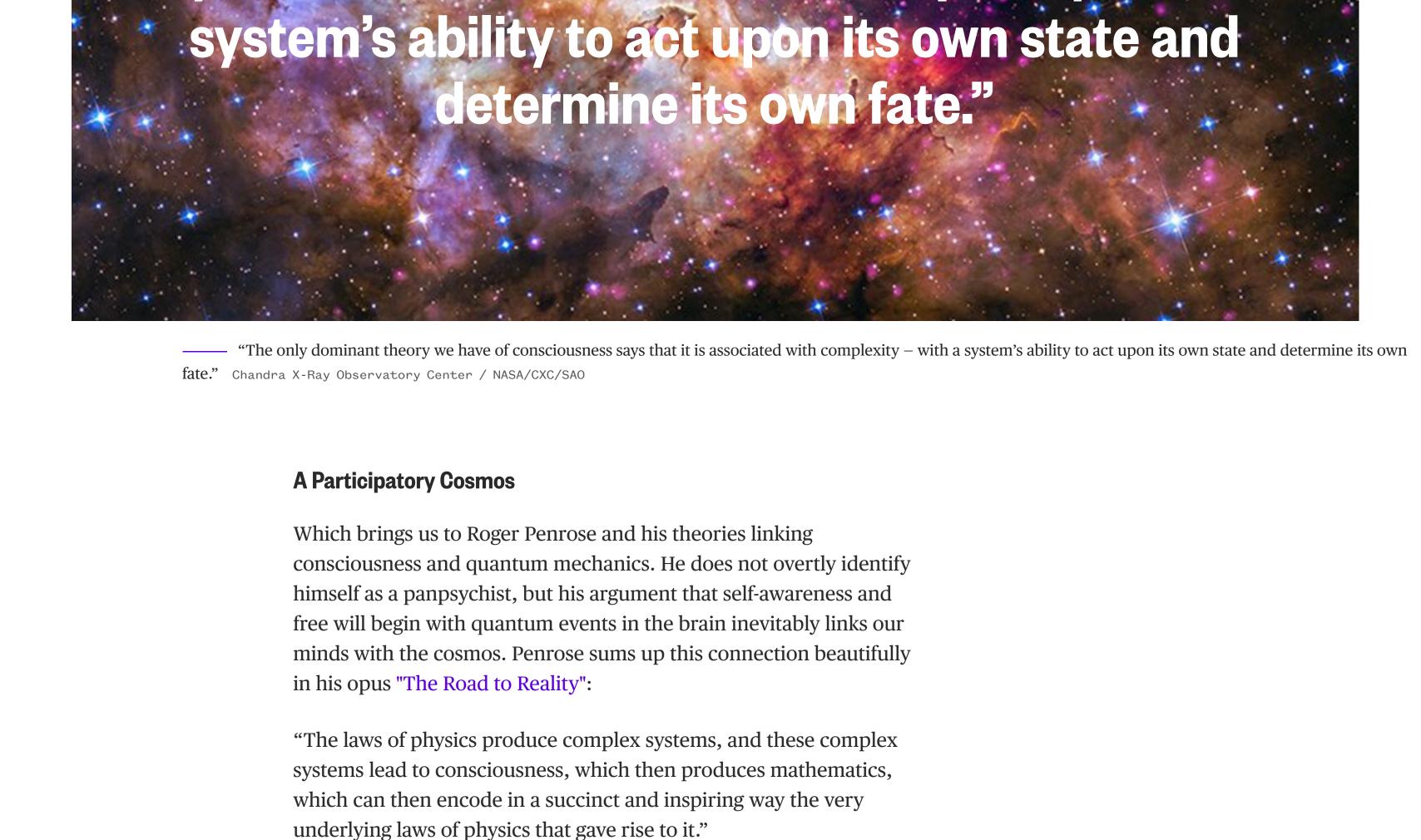
star may have an internal life that allows it to "feel," but whatever

that feeling is, it is much less than the feeling of being an E. coli.

On the other hand, "even systems that we don't consider animate

Although the sun is vastly bigger than a bacterium, from a

could have a little bit of consciousness," Koch says. "It is part and parcel of the physical." From this perspective, the universe may not exactly be thinking, but it still has an internal experience intimately tied to our own.



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says that it is associated with complexity — with a

been more accepting of the exotic, cosmic-consciousness implications of quantum mechanics. Ever since the 1920s, physicists have puzzled over the strangely privileged role of the observer in quantum theory. A particle exists in a fuzzy state of uncertainty...but only until it is observed. As soon as someone looks at it and takes its

measurements, the particle seems to collapse into a definite

location.

being – that is, us.

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Despite his towering stature as a physicist, Penrose has encountered

resistance to his theory of consciousness. Oddly, his colleagues have

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and snaps into clear, actual being when observed by a conscious

"We are participators in bringing into being not only the near and here but the far away and long ago," Wheeler said in 2006. He calls his interpretation the "participatory anthropic principle." If he is correct, the universe is conscious, but in almost the opposite of the way that Matloff pictures it: Only through the acts of conscious minds does it truly exist at all.

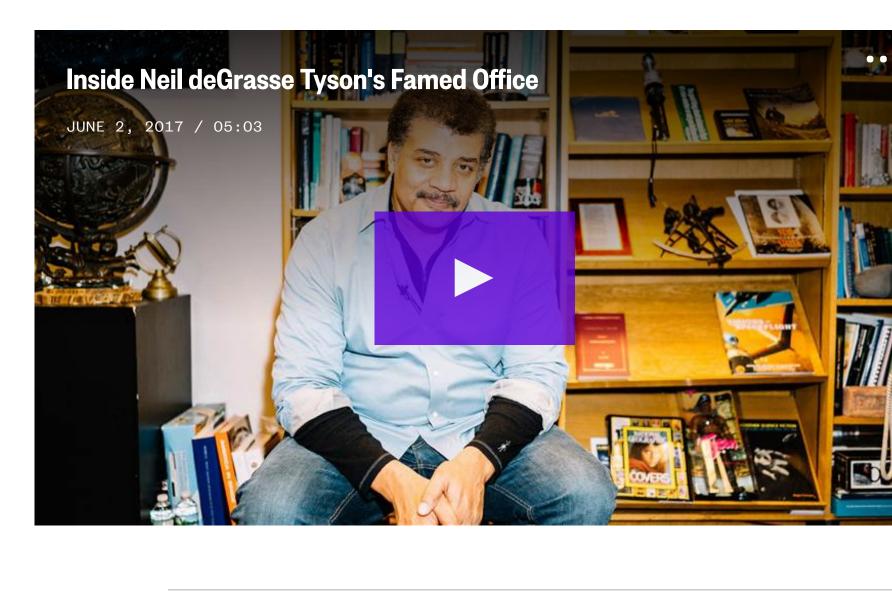
It is hard to imagine how a scientist could put the participatory

anthropic principle to an empirical test. There are no stars to

monitor, and no brains to measure, to understand whether reality depends on the presence of consciousness. Even if it cannot be proven, the participatory anthropic principle extends the unifying agenda of modern science, powerfully evoking the sense of connectedness that Albert Einstein called the cosmic religious feeling. "In my view, it is the most important function of art and science to

awaken this feeling and keep it alive in those who are receptive to it," Einstein wrote in a 1930 New York Times editorial. Explorers like Matloff are routinely dismissed as fringe thinkers, but it is hard to think of any greater expression of that feeling than continuing the quest to find out if our human minds are just tiny components of a much greater cosmic brain.

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