

Associate professor Stephen Hsu's research has applications for the knowledge and understanding of wormholes. His findings have led him to believe the existence of wormholes is unlikely.

ZANE RITT | PHOTOGRAPHER

UO researchers doubt existence of wormholes

A 'fundamental question of physics,' wormholes came into public interest after Carl Sagan wrote about them

BY EVA SYLWESTER
NEWS REPORTER

Wormholes and the time machines that can theoretically travel through them have been the subject of science fiction movies and novels for decades. A team of researchers in the University's Institute of Theoretical Science has found the existence of wormholes to be unlikely.

Associate professor of physics Stephen Hsu said the findings, which have received media attention in Great Britain, Canada and Argentina, were actually derived from a search of less sensational knowledge regarding the fundamental properties of matter, energy and pressure.

"It's funny that certain things really capture the public attention and other things that we do ... generally don't capture the public's imagination," Hsu said.

Hsu described wormholes as similar to a tube connecting two distant points in the universe, like a shortcut. In theory, they could be used for time travel.

Hsu said public and scientific interest in wormholes began when astronomer Carl Sagan wrote a quasi-realistic novel featuring them 20 or 30 years ago.

"It was ironic that a scientist writing science fiction got other scientists to think about it," Hsu said. "It appears in science fiction, but it's a very fundamental question of physics."

Hsu said his work is heavily mathematical, in the domain of theoretical rather than experimental physics.

"We can ask mathematically, 'If one could have a wormhole, what properties would it have?'" Hsu said.

Post-doctoral fellow Roman Buniy said other researchers had been constructing and testing models of dark energy, a poorly

understood force scientists believe comprises about three-fourths of the universe. He and Hsu worked to determine which of these models was possible and impossible. In this work with a broad class of theories, they found that if some important condition of the laws of the universe was violated in a system, the system was completely unstable.

Buniy said Hsu noticed this would apply to wormholes.

"It's almost as if there's a kind of conspiracy," Hsu said. "Whenever you try to build a wormhole, it'll be unstable."

Hsu said wormholes would be likely to fall apart because tiny disturbances inside would be magnified.

"It's a very violent instability," Buniy said. "For physicists, it's very ... contrary to every belief. You would just have to rule it out."

Buniy said in a normal situation, a disrupted system returns itself to its original condition, but a wormhole would require that not to be true. He said a normal system is like a ball at the bottom of a concave pit, where even if the pit is shaken the ball will eventually return to its original position. By contrast, an unstable system such as a wormhole is like a ball balanced on top of a sphere, which will roll off at the slightest provocation and not come back on its own.

Buniy said the existence of quantum time machines or wormholes was not ruled out, only the existence of wormholes in the world that humans inhabit. However, in the quantum world, where one small particle can turn into another, time travel would be extremely unpredictable.

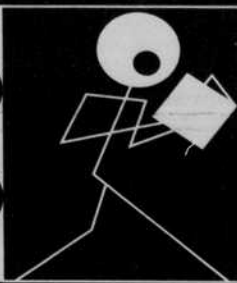
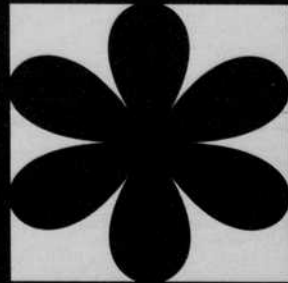
"If you do jump out, it may be not you," Buniy said.

Buniy said the team may look more carefully at quantum systems in the future.

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