Successfully creating cosmic black holes, demonstrating Hawking radiation exists

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Black holes are one of the most strange and mysterious things in the universe that people desire to discover. According to many scientists, black holes contain a great amount of energy that keeps our galaxy from floating in the universe.

To successfully create a laboratory "black hole" black hole, a smaller and ″ more *gentle* " version than scientists used to use extremely cold gas of more than 2,000 atoms. This success has helped people to make great strides in studying the mysteries in the universe. Scientists hope in the future we can capture the power in the universe.

According to physicist **Stephen Hawking** : black holes are not black at all because they still emit a kind of radiation.

First, a black hole is an area of ??spacetime with extremely dense material density, with gravitational force so strong that no matter even photons make light.

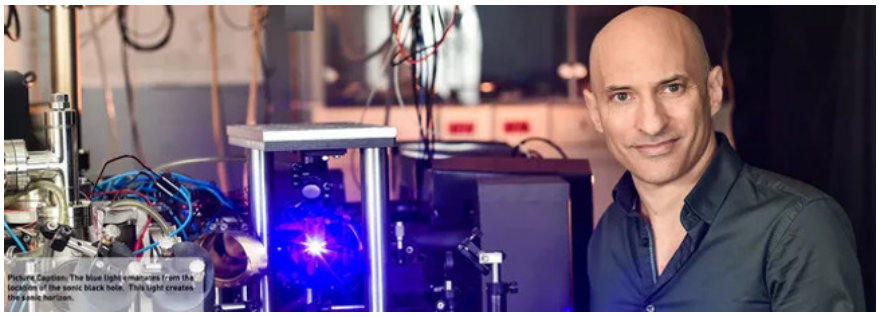
In 1974, physicist Stephen Hawking hypothesized that in **the horizon of the event of a black hole** (the area that marks the limit that nothing can return), there are strange effects of **quantum physics.** occurs, causing particles to survive and radiate out of the black hole.

Called **Hawking radiation** , this phenomenon occurs quite weakly but the end result will still be that black hole is "dying", with such frequent energy loss. No one has been able to detect this radiation phenomenon in a real black hole in the universe.

Recently, the Israeli team has produced a tiny black hole right in the laboratory and they have discovered a very similar emission of what is mentioned in the " *Hawking radiation* " theory, with Using a material called *"Bose-Einstein condensate* " to create a black hole.

As their name suggests, **Einstein's genius** also contributed to predicting this strange state of matter, which occurs when a diluted gas is cooled to "absolute zero" (absolute zero). At such a low temperature, there is very little thermal activity in this type of gas and their particle state will overlap, creating strange phenomena, including superfluid, superconducting and musically is the ability to simulate a cosmic black hole when accompanied by the use of sound waves.

" *The problem of verifying Hawking radiation lies more in the background than the radiation itself. In fact, Bose-Einstein condensate is so cold that they have too few waves in it to follow. watch,* "said Jefff Steinhauer, the research leader.



Green light emanates from the location of the artificial black hole, which is the light that creates the black hole's horizon.

With so many thousands of silent gas atoms, Steinhauer took them into a long, thin tube, forcing them to move with the laser, in order to create a black hole containing sound waves in their gas layers. This is not the first time scientists have created a black hole with **supersonic waves** , but using Bose-Einstein condensate, Hawking radiation monitoring is really easy.

Atomic ducts consist of two regions: a region that sends the atom slowly, the remaining area accelerates their velocity, the transition point between the two regions will be like water flowing down a waterfall: their acceleration will increase. suddenly. The whole system is designed like what happens in the event of a black hole's event horizon.

" *Once the atoms move fast enough, sound waves will not be able to overcome the flow of those atoms,* " Steinhauer said. " *These sound waves move as if they are countering the current and this is similar to what happens in the black hole. Sound waves are always trying to get out, but they can't do it. They are sucked in as well. like how photons are sucked in. "*

When Steinhauer studied this artificial black hole's event horizon, he realized that sound waves were coming out and this reminded him immediately of what Hawking radiation was referring to.

Steinhauer had to repeat this experiment 4,600 times, *"it was 6 days of continuous experimentation and measurement* " to obtain this result.

With the proof that Hawking radiation exists, at least in a black hole created in the laboratory, Steinhauer applied quantum physics into the classical field of gravity. Physicists are still digging into the correlation between these two areas and verifying that Hawking radiation is true will be a huge step forward in this research journey.

" *Black holes are a great test environment for new laws of physics,* " said Steinhauer. An atomic cloud in the laboratory will be where people discover more.