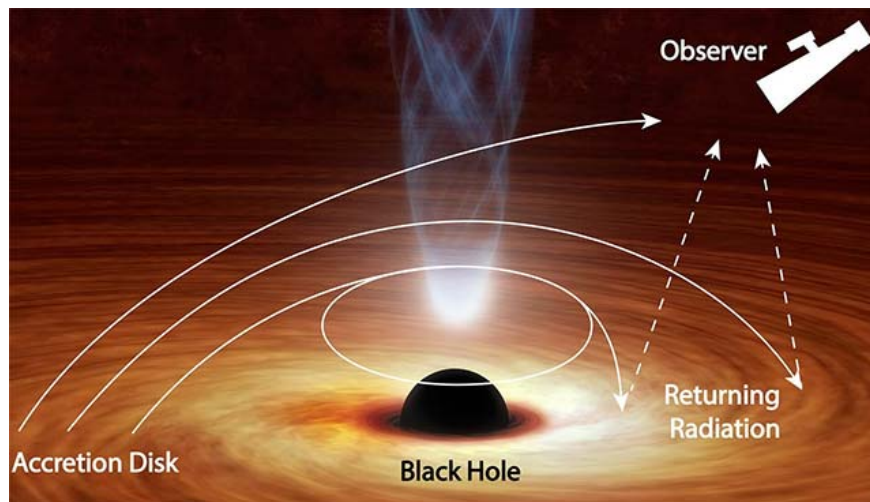


A new discovery about the strange interaction between cosmic black holes and light

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Surely many of us have heard of 'anecdotes' without anything in the universe able to escape the gravity of black holes, not even light. This has been proven to be true, but mostly happens in the center of black holes and surrounding areas. At slightly further positions in the physical disks swirling around some of the recorded black holes, light could still, essentially, escape. This is why astronomers observe many growing black holes shine bright with X-rays.

However, not all streams of light entering the swirling matter disk region of the black hole can escape easily. A new study, published in *The Astrophysical Journal*, provides evidence that light must be very 'hard' to escape from the swirling matter disk, some of which are affected by animated by the black hole's gravitational pull, turning back, and finally bouncing off the physical disk and 'escaping'.



The illustration shows some light from a disk of matter around the black hole

"We observed that light coming from very close to the black hole was trying to escape, but was pulled back like a boomerang by the black hole. This is something that has been predicted since the 1970s, but until now it has been fully observed," said astronomer Riley Connors, the expert in charge of the research team.

The scientists obtained these new findings by combining at the same time a large amount of observational data stored from NASA's *XMM-Newton* (XTE) mission, which ended in 2012. In particular, the research team paid special attention to a black hole being orbited by a star almost like the sun. Together, this 'couple' is called XTE J1550-564. The black hole "nurtures" the star, pulling matter onto a flat structure around it called an accretion disk. By observing the X-rays emitted from the disk as spiral light is directed toward the black hole,

the team has found markers that show the light has been bent toward the disc and reflected.

'Basically accreting material discs can emit light themselves. Cosmological theorists have previously predicted which part of the light will go back on the disk, and now, for the first time, we have been able to confirm those predictions.' said.

This new observation provides another indirect confirmation of Albert Einstein's general theory of relativity, and will also help to understand future measurements of the rate of black hole rotation - something that is still not well understood. .

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