



New Spin on Black Holes: Like Stars, They Rotate

By **Robert Roy Britt**
Senior Science Writer
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While scientists are nearly certain that matter spins violently into the vortex of a black hole, new research shows that a black hole itself can rotate, just like a star.

[inset]

As matter swirls into a black hole, it moves faster and faster as it approaches a sphere of influence known as the event horizon, beyond which nothing, not even light, can escape. This event horizon represents what researchers call an innermost stable orbit.

Inside this sphere, things get weird. The normal laws of physics no longer apply, and the very workings of space and time are warped.

When gas, dust or other matter nears the event horizon, it unleashes incredible energy, which researchers had previously spotted as flashes of X-ray energy -- pulses created as a blob of matter rotates around the black hole. Other calculations show that the matter disappears beyond the event horizon at a distance from the center that would be expected based on the objects' estimated mass.

But the new study, led by Tod Strohmayer of NASA's Goddard Space Flight Center in Maryland, found these flashes occurring at a more rapid pace. This means the blob is even closer to the black hole, a situation that Strohmayer said could only occur if the black hole itself were spinning, toying further with space-time.

He presented the findings April 30 at the meeting of the American Physical Society in Washington, D.C.

If proved true, black holes would join a long list of stellar objects that rotate, from asteroids to planets to stars and even galaxies. But because black holes have no solid surface to observe, researchers have not until now had any concrete evidence that some of them might rotate.

"We can, however, see the [X-ray] light emitted from matter plunging into the black hole," Strohmayer said. "The matter, cannibalized from the black hole's nearby binary companion star, whips frantically around the black hole before it is lost forever."

If you find the idea of a rotating black hole a little difficult to imagine, you're not alone.

"I struggle with that also," Strohmayer said in an interview. "You have to rely on the mathematics, because you don't have the same type of intuition [as with a planet or star]."