



Black Hole Swallows Neutron Star, Observations Suggest

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A distant eruption of high-energy gamma rays is evidence for a black hole swallowing another dense object called a neutron star, astronomers announced today.

A neutron star is a stellar corpse with a mass equal to a few suns packed into a space no more than 12 miles across. Black holes are even denser objects, so dense that matter and even light can't escape once inside their spheres of invisible influence.

Scientists have long suspected collisions between these objects are common. Other recent bursts have looked similar, but observations from NASA's orbiting Swift satellite and other telescopes, recorded July 24 and reported in the Dec. 15 issue of the journal *Nature*, are the most detailed.

Astronomers speculated about what might have happened.

"For billions of years, this black hole and neutron star orbited each other in a gravitational tug-of-war," said Scott Barthelmy of NASA Goddard Space Flight Center. "The neutron star lost."

The flash of gamma rays lasted just a few milliseconds. Afterglows of X-rays, radio waves, visible and infrared light were detected thereafter.

The afterglows are an important clue.

Barthelmy and colleagues figure the neutron star was stretched into a crescent shape as "crumbs" broke off. The black hole might have swallowed the bulk of the neutron star in one gulp, while the other chunks were consumed in the hours that followed. Each bite generated radiation.

If the event, named GRB 050724, had been a [merger between two neutron stars](#), there wouldn't have been so many crumbs left over. The two objects would smash, instantly form a black hole, and after a modest afterglow no more light would be seen, the astronomers theorize.

Colliding [black holes](#) likewise should not generate much afterglow.

Longer gamma-ray bursts, lasting seconds, are thought to signal the deaths of massive stars at the ends of their normal lives.

"There's only one thing I know of that could rip apart a neutron star with bits flying out, and that's a black hole," said one of the study's

co-authors, Peter Meszaros of Penn State University. "Now we have the first evidence that this might actually be occurring."

The apparent merger took place in the outskirts of an old, mostly dead galaxy known to be loaded with neutron stars and black holes. That further suggests the event was not related to a stellar explosion, which would be more likely to occur in a young, star-forming galaxy.