

# Astronomers put forward new theory on size of black holes

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If matter and antimatter repel each other, the quick conversion of one into the other inside a supermassive black hole may look like a Big Bang. Image credit: NASA

(PhysOrg.com) -- Astronomers have put forward a new theory about why black holes become so hugely massive – claiming some of them have no 'table manners', and tip their 'food' directly into their mouths, eating more than one course simultaneously.

Researchers from the UK and Australia investigated how some [black holes](#) grow so fast that they are billions of times heavier than the sun.

The team from the University of Leicester (UK) and Monash University in Australia sought to establish how black holes got so big so fast. Their

research is due to [published](#) in the *Monthly Notices of the Royal Astronomical Society*.

*Inclination is 150 degrees with full 3D rendering. These movies were made using the SPH visualisation software splash written by Daniel Price.*

*Inclination is 120 degrees.*

Professor Andrew King from the Department of Physics and Astronomy, University of Leicester, said: "Almost every galaxy has an enormously massive black hole in its centre. Our own galaxy, the Milky Way, has one about four million times heavier than the sun. But some galaxies have black holes a thousand times heavier still. We know they grew very quickly after the Big Bang."

"These hugely massive black holes were already full--grown when the universe was very young, less than a tenth of its present age."

Black holes grow by sucking in gas. This forms a disc around the hole and spirals in, but usually so slowly that the holes could not have grown to these huge masses in the entire age of the universe. "We needed a faster mechanism," says Chris Nixon, also at Leicester, "so we wondered what would happen if gas came in from different directions."

Nixon, King and their colleague Daniel Price in Australia made a computer simulation of two gas discs orbiting a black hole at different angles. After a short time the discs spread and collide, and large amounts of gas fall into the hole. According to their calculations black holes can grow 1,000 times faster when this happens.

"If two guys ride motorbikes on a Wall of Death and they collide, they lose the centrifugal force holding them to the walls and fall," says King. The same thing happens to the gas in these discs, and it falls in towards

the hole.

This may explain how these black holes got so big so fast. "We don't know exactly how gas flows inside galaxies in the early universe," said King, "but I think it is very promising that if the flows are chaotic it is very easy for the black hole to feed."

The two biggest black holes ever discovered are each about ten billion times bigger than the Sun.

Provided by University of Leicester

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