

HOW CAN A BLACK HOLE BE IMAGED?

Relevant for: Geography | Topic: The Earth and the Solar System

This image released on April 10, 2019 by Event Horizon Telescope shows a black hole. Scientists revealed the first image ever made of a black hole after assembling data gathered by a network of radio telescopes around the world. Photo: Event Horizon Telescope Collaboration/Maunakea Observatories | Photo Credit: [AP](#)

At a press conference held simultaneously in six places around the world, the Event Horizon Telescope revealed the first ever photograph of the shadow of a black hole.

Decades of effort and bringing together scientists resulted in the world's first glimpse of the shadow of the supermassive black hole at the centre of the galaxy Messier 87 (M87).

This is 55 million light years away from the Earth. Telescopes from eight centres across the world worked as one unit to piece together this image.

The stunning image looked like an uneven gold ring, heavier at the lower end than the upper.

Analysis revealed that what was within the dark inner circle was rotating clockwise. This could either be the black hole itself or matter that was falling into it. The mass of this black hole was calculated to be 6.5 billion times the mass of the Sun and its diameter is 100 billion kilometres.

Though the Event Horizon Telescope set out to image both M87 and Sagittarius A* the black hole at the centre of the Milky way, they have succeeded only in imaging the former, despite its being much further away.

"This is a marvelous discovery because it is the first time we have actually seen the shadow of a black hole. But it is not surprising that M87 was imaged and not Sagittarius A* because the brightness of the material around M87. Since Sagittarius A* is not as heavily accreting, any small variation in the light from the material around the black hole will make it much harder to image," says Professor Prajval Shastri, Senior Associate at International Centre for Theoretical Physics and an expert in this field.

"If immersed in a bright region, like a disc of glowing gas, we expect a black hole to create a dark region similar to a shadow — something predicted by Einstein's general relativity that we've never seen before," explained chair of the EHT Science Council Heino Falcke of Radboud University, the Netherlands, in a press release given out by the Event Horizon Telescope. "This shadow, caused by the gravitational bending and capture of light by the event horizon, reveals a lot about the nature of these fascinating objects and has allowed us to measure the enormous mass of M87's black hole." The results are published in six papers in a special issue of The Astrophysical Journal.

How can one image a black hole when it is known that even light – the fastest object in the universe – does not have a high enough velocity to escape its gravitational pull? The fact is, the black hole itself cannot be seen, but at a definite distance from the black hole lies its event horizon, which marks an important boundary. Any object including light that falls within its event horizon is sucked into the black hole. However, if something that orbits the black hole outside the event horizon shines as it usually does, the black hole can be seen in silhouette against this shine.

Normally stars and other massive objects close to the black hole orbit it and slowly spiral into it. Gas falling into the black hole swirls around it, forming an “accretion disc”. In the accretion disc, the gas gets get heated and emits radiation, or light. Given its powerful gravitational power, the black hole acts as a lens, bending this light. This light can escape and even reach the Earth and be detected. The light coming from M87, a giant elliptical galaxy in Virgo A constellation, was in fact measured by the Event Horizon Telescope earlier. M87 has a black hole at its heart which, at 6.5 billion times the Solar mass, is one of the most massive blackholes known. The effort in effect mapped out the shape of the event horizon.

Please enter a valid email address.

For about 70km around Ariyalur is a wealth of natural history that few people know about

Join our online subscriber community

Experience an advertisement-free site with article recommendations tailored for you

Already a user? [Sign In](#)

To know more about Ad free news reading experience and subscription [Click Here](#)

or Please remove the Ad Blocker

END

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

Crackin