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Black hole - the clause

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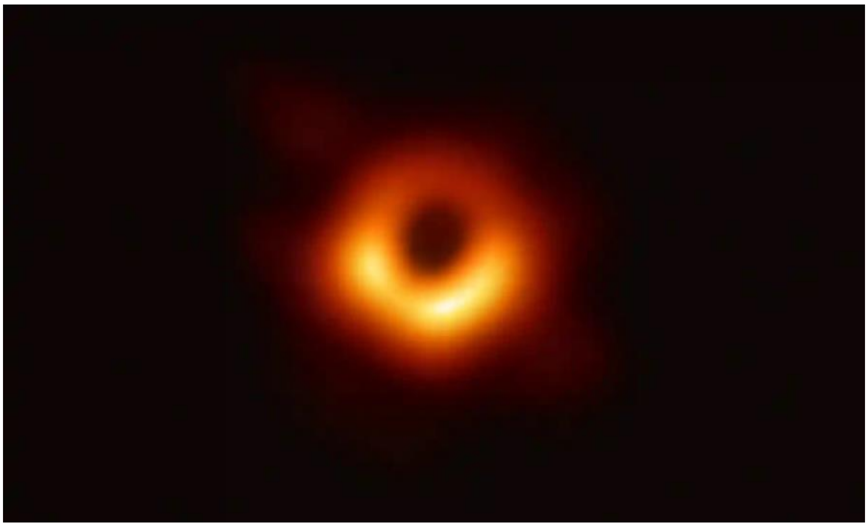
Black holes have not been confirmed as existing by recent exciting pronouncements in the news media; there is a get-out clause that is often overlooked.



There is a great deal of excitation at the moment that an image has been taken of a black hole, for the first time. [1]

So, it makes it seem that black holes have been confirmed as existing; but there is a clause it might not be a black hole; this clause is not often stated. But there are examples of those who will admit it, such as New Scientist [2] says: “We have spent the past few decades coming to terms with the fact that they [i.e. black holes] – or something very like them – are real.”

So, the image might not be a black hole, but instead “something very like them”.

The problem with black holes is of cause the singularity.

If scientists keep presenting the propaganda that black hole image has been made, without stating the get-out clause, they are then giving the impression of the singularity has been confirmed – when it hasn’t.

There are more sensible candidates for the image such as Boscovichian black hole, which one article describes as an “almost black hole.” [3]

Wikipedia gives Timeline of black hole physics as starting long before Einstein as [4]:

Pre-20th Century

1640 — Ismaël Bullialdus suggests an inverse-square gravitational force law

1676 — Ole Rømer demonstrates that light has a finite speed

1684 — Isaac Newton writes down his inverse-square Law of universal gravitation

1758 — Rudjer Josip Boscovich develops his Theory of forces, where gravity can be repulsive on small distances. So according to him strange classical bodies, such as white holes, can exist, which won't allow other bodies to reach their surfaces

1784 — John Michell discusses classical bodies which have escape velocities greater than the speed of light

1795 — Pierre Laplace discusses classical bodies which have escape velocities greater than the speed of light

1798 — Henry Cavendish measures the gravitational constant G

1876 — William Kingdon Clifford suggests that the motion of matter may be due to changes in the geometry of space

The relevant highlights are (1) Boscovich’s theory 1758; which I deem more comprehensive than Newton’s theory and effectively unified field theory. (2) John Michell 1784 considering bodies with escape velocities greater than light, which happened long before bodies with escape velocities greater than light were considered in context of Einstein’s relativity.

References

[1] see for instance: The first black hole image: what can we really see? Brenna Cooper, Sun 14 Apr 2019

https://www.theguardian.com/science/2019/apr/14/the-new-black-hole-what-can-we-really-see

[2] New Scientist 20 April 2019 p5

The black hole wow factor

An amazing feat presages tougher challenges still to come

WOW. That was what Katie Bouman's face said, in an image widely shared on social media, as she saw what she and her colleagues had made: the first picture of a black hole (see page 6). If anyone wonders if science has anything to offer, or is for them, take a look at the joy, disbelief and pride shown by the diverse, global team of scientists who made it happen. Yes, it does, and yes, it is.

Sometimes on an untrodden path, you need time to find the way. *New Scientist* reported on the first attempts to snap a black hole almost exactly 10 years ago, and we have checked in regularly since. In our special issue of 10 October 2015 celebrating 100 years of Albert Einstein's general theory of relativity, Heino Falcke, one of the Event Horizon Telescope's prime movers, said he hoped the breakthrough would come within a decade.

Congratulations to the entire Event Horizon Telescope team – you got there. What a rich story lies behind the project. Let's put it out there: there is no more fascinating, incomprehensible, majestic conception of a human mind than a black hole. Rips in the fabric of the universe, these points of infinite density and curvature suck in anything that comes too near. Even Einstein baulked at accepting this consequence of his theory. We have spent the past few decades coming to terms with the fact that they – or something very like them – are real. Now we can see them, perhaps we can begin to get to grips with what they are.

Directly imaging a black hole is the beginning of a story, not the end. What happens inside one? Following the paths you might take were you to be sucked in, as Chelsea Whyte does on page 30, is a delightful (if distinctly uncomfortable) conceit – but the variety of scenarios she sketches lays bare how little we know.

"Black holes are a huge triumph and an even bigger challenge for established theories of physics"

The truth is, black holes are a huge triumph and an even bigger challenge for current theories of physics. Events at their event horizons expose a yawning gap between general relativity and the other great load-bearing wall of modern physics, quantum theory. The mathematical "singularity" of infinite density and space-time curvature that supposedly lies at the hearts of black holes is an admission of defeat in a universe ill set up to accommodate real, physical infinities.

For all the light that Einstein's theories shed on the cosmos, they also cast a shadow we must be prepared to jump over. In what is fast becoming routine, the past week also saw the detection of two more gravitational waves, bringing the total number of these ripples in space-time we have seen to 13 (see page 7). But for general relativity to fully add up, the overwhelming weight of stuff in the universe must come in forms we have yet to see and struggle even to characterise: dark matter and dark energy. That conundrum is forcing modern physics to breaking point (see page 44).

Better answers will require even better observations, and perhaps theories that bridge the quantum-relativity divide – the great, unresolved quest of fundamental physics. Those who wish to follow in Bouman's footsteps won't lack problems to work on. Just: wow. How far we have come. How far we still have to go. ■

[3] Almost-Black-Holes: an Old-New Paradigm O. E. ROSSLER, H. KUYPERS and H. H. DIEBNER http://diebner.de/texts/blackholes.pdf

[4]
https://en.wikipedia.org/wiki/Timeline_of_black_hole_physics at 20 August 2019